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ANALYSIS OF THE

MANDATORY MOTORCYCLE HELMET ISSUE

Prepared for

GOVERNOR'S TRAFFIC SAFETY COUNCIL
Commonwealth of Pennsylvania

August 1977

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REPLY REFER TO

September 1, 1977

Motorcycle Helmet Study

Members of the Governor's Traffic Safety Council

At the March 29, 1977, meeting you expressed concern that legislation was being considered in both the House and Senate which would repeal or substantially change the present motorcycle helmet law. Since there appeared to be many contradictory reports about the helmet question, you directed the Highway Safety Group to complete a thorough analysis of the motorcycle helmet issue with particular regard to the effectiveness of helmets and a constitutionality of the laws which would require their use. The report was also to include an assessment of the attitudes of both the motorcyclists and the general public regarding the use of helmets and the present helmet law.

I am pleased to present this report prepared by Mr. Harry Balmer Jr. of the Highway Safety Group which is a comprehensive review and analysis of over 150 papers, articles and published data known to be available at this time. It is a synthesis of information which heretofore has been scattered, fragmented, overlooked, or undocumented and often unevaluated. The report also includes results of the survey made in Pennsylvania of the attitudes and opinions of the cyclists and the general public.

Both sides of the helmet question are discussed objectively and the resulting conclusions are presented strongly and clearly. Copies of this report will be distributed to members of the legislature as you requested and it is my hope that each legislator reviews the report's contents prior to considering motorcycle helmet law legislation.

Sincerely,

R. R. Coleman

Robert R. Coleman, P.E.
Executive Director
Governor's Traffic Safety Council

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ANALYSIS OF THE
MANDATORY
MOTORCYCLE HELMET
ISSUE

AUGUST 1977

Prepared for:

The Governor's Traffic Safety Council

James B. Wilson, P.E., Chairman
Secretary of Transportation

By: Harry E. Balmer Jr.
Program Manager
The Highway Safety Group

EXECUTIVE SUMMARY

ANALYSIS OF THE MANDATORY MOTORCYCLE ISSUE

On March 29, 1977, the Governor's Traffic Safety Council (GTSC) directed that an analysis be made of the pro and con claims concerning the effectiveness of motorcycle helmets and motorcycle helmet laws. This report presents the results of that analysis and the results of a survey of the attitudes of Pennsylvania's motorcyclists and general public concerning the helmet issue.

Over one hundred and fifty papers, articles and other published items were reviewed representing both sides of the issue. Of this large number, approximately 35 sources presented original data or statements of new positions or opinions. The analysis has been based on original material wherever possible.

The conclusions reached by this analysis confirm the value of the helmet in reducing the severity of head injuries in motorcycle accidents. No evidence was found to support claims of adverse effects (e.g. accident causation, injury causation, etc.) by wearing a helmet. It was also found that there is substantial circumstantial evidence that indicates helmet laws are effective in reducing motorcycle fatalities and serious injuries; and that repeal of such laws may be accompanied by a significant increase in motorcycle fatalities.

A significant unknown of the motorcycle issue, the opinion of Pennsylvanians concerning the helmet and helmet law, was determined during this study. It was found that a large majority (over 87%) of the adult population favor both the helmet and helmet law. A large majority of Pennsylvania motorcyclists (79%) favor helmets and a majority (55%) favor the mandatory helmet use law.

The report also suggests that the overall effects of the repeal of a mandatory helmet law by some states in early 1976, may not be fully determined as yet, and should be monitored closely during the next several years.

ANALYSIS OF THE MANDATORY MOTORCYCLE HELMET ISSUE

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INTRODUCTION AND SUMMARY OF CONCLUSIONS

In the Highway Safety Act of 1976, the U. S. Congress prohibited the U. S. Secretary of Transportation from invoking sanctions against those few states which had not enacted a mandatory motorcycle helmet use law. This action was taken apparently with the view that the 47 states already having such a requirement would not repeal their existing laws. Such was not the case, and repeal bills were introduced in almost every state including Pennsylvania.

This analysis is prepared by the Highway Safety Group as directed by the Governor's Traffic Safety Council (GTSC) at their meeting of March 29, 1977. The GTSC directed that the following be conducted by the Highway Safety Group to provide the members, legislators and the public with valid information about the pros and cons of helmets and their mandatory use:

> "The Highway Safety Group shall compile a comprehensive analysis of existing information and statements on the effectiveness of motorcycle helmets and on the constitutionality of laws requiring their use; and
>
> Shall prepare, in conjunction with the staffs of the House and Senate Transportation Committees, and shall conduct a survey of both motorcyclists and the general public to determine attitudes about the present helmet law."

To accomplish these tasks the Highway Safety Group has collected and analyzed all available statements and data representing the conflicting claims of those for and against mandatory helmet laws. Personal contacts were made with a number of persons in the states which have recently repealed their helmet laws. In particular, Pennsylvania data, both present and historical, has been examined to determine if the current mandatory helmet law has had any effect on the traffic accident picture. The results of the public and motorcyclists' attitudes survey have also been included in this analysis.

To facilitate the analysis, the conflicting claims have been grouped into six general classifications:

1. Effects of helmets.
2. Effects of the mandatory helmet law.
3. Constitutionality.
4. Societal costs.
5. Discrimination.
6. Public and motorcyclists' attitudes.

In this report various claims, counterclaims, and conflicting data within these classifications are examined and discussed. Every attempt has been made to accurately portray the positions and supporting data of each side of the issue. Similarly, every attempt has been made to conduct the analysis in a completely unbiased fashion.

As a result of this analysis the following general conclusions have been reached.

1. The effects of helmets are as follows:

   a. Helmets do play a significant role in preventing serious head injury to motorcyclists in accidents.

   b. Helmets do not cause injuries and/or fatalities to motorcyclists in accidents.

   c. The wearing of helmets by motorcyclists does not contribute to or cause accidents through vision or hearing impairment or by creating a feeling of overconfidence.

2. On the effects of mandatory helmet laws:

   a. Mandatory helmet laws do significantly increase helmet usage by motorcyclists.

   b. Historical and current data suggest that mandatory helmet laws can produce a reduction in motorcyclists' fatalities and injuries. The data are not conclusive however.

3. Laws requiring persons to protect themselves from serious injury and death, including mandatory helmet laws, have been held by Federal and State courts to be within the constitutional powers of government.

4. Traffic accidents, and motorcycle accidents in particular, do produce significant costs to society in general. This is particularly true in Pennsylvania where motorcyclists are outside the mandatory no fault insurance provisions.

5. Motorcyclists, as a class of traffic, do appear to be discriminated against in the broad sense. Although a number of self-protection techniques for other classes of traffic are proven and available, there does not seem to be any other significant self-protection mandates enacted for other classes of Pennsylvania traffic, such as automobile drivers, bicyclists, or pedestrians. The differential treatment of motorcyclists is necessarily prejudicial, however, and is not legally "discrimination" in the narrow, negative definition of the word.

6. Public and motorcyclists attitude and opinion. Based on a recently completed, statistically valid statewide survey of Pennsylvanians, the following attitudes and opinions were found to exist in Pennsylvania:

> An overwhelming percentage (92%) of the general public believes that the use of helmets by motorcyclists is effective in reducing injuries. A large majority of motorcyclists (79%) also believe helmets are effective in reducing injuries.
>
> As to a helmet law, 87% of the general public holds the opinion that the government should require mandatory use of motorcycle helmets as did a majority (55%) of motorcyclists.

The overall conclusion of this study is that there are no substantive safety-related issues remaining to be decided. Helmets are an effective safety device which should be worn by motorcyclists at all times. The sole remaining issue to be decided is philosophical in nature, and can be stated as follows:

"The Public of Pennsylvania and its State Government, is/is not willing to absorb a portion of the costs of motorcycle injuries and fatalities." It appears, from the recently completed statewide survey, that the general public and a majority of motorcyclists feel that the mandatory helmet law should be retained and by inference that the public is not willing to absorb additional societal costs.

I. BACKGROUND

A. HISTORICAL BACKGROUND

The desire to protect the human head probably originated prior to recorded history. Most ancient civilizations for which records are available indicate some form of helmet was used on the human head in one instance or another. Prior to the 20th century, however, the uses of helmets was primarily limited to situations involving combat. During the 20th century helmets have become a common part of life. They are used not only in sports such as football, roller derby, etc., but have become accepted wear for occupational pursuits, particularly in the construction and manufacturing industries and other similar occupations.

Motorcycles have been in existence in the United States since the early 1900's. Until the middle 1960's, they were relatively few in number and were not considered a significant portion of the transportation system. In contrast, the motorcycle has been an important transportation mode in much of the rest of the world for 50 years or more. Because of this, the initial investigations into the use of helmets by motorcyclists were conducted in Great Britain. Between 1940 and 1943 in-depth studies were conducted in Great Britain to determine if crash helmets were effective in reducing motorcyclist injuries. Significant investigations continued through the mid 1950's and the life-saving potential of motorcycle helmets had apparently been demonstrated.

On January 1, 1961, a law became effective in the State of Victoria (Australia) making it mandatory for all motorcycle riders to wear safety helmets. A relatively thorough study of the data both two years before and after implementation of the law apparently convinced the Australians that a mandatory helmet use law was enforceable and that the resultant helmet use reduced fatalities in motorcycle accidents. In 1966, prior to enactment of the Federal Highway Safety Act, New York state and Michigan state adopted helmet use laws.

On September 9, 1966, the Highway Safety Act of 1966 was signed into law. The law provided that "Each state shall have a highway safety program approved by the Secretary, designed to reduce traffic accidents and deaths, injuries, and property damage resulting therefrom. Such programs shall be in accordance with uniform standards promulgated by the Secretary." The Congress, in its report accompanying the legislation (H.R. Report #1700) stated the following:

> "The Public Works Committee is as jealous of the perogatives of the States as any Committee of the Congress, perhaps more so than most. Our record in the Federal/State partnership legislation is second to none, and all of it is in legislative fields embracing the total national welfare, vital to the future life and well being of our entire society. But we learn from experience, and experience in this field clearly demonstrates that if we continue to rely on voluntary action in highway safety, a larger percentage of the citizens in these United States is going to wind up in a smash up. Mandatory compliance with broad Federal highway safety standards could be made to seem very unpopular (and the Committee realizes that there will be those who will attempt to accomplish exactly this), simply because to the average motorist, the prospect of accident, injury, or death

> does not apply to him. It applies to the other fellow. Everyone is in favor of a crackdown, as long as it isn't a crackdown on him. ...... But, if we insist now upon a mandatory program, we may be able to keep more and more of our parents, and our husbands and wives, and our children, and our friends, and ourselves, alive in the years after that."

On July 10, 1967, the U. S. Secretary of Transportation transmitted to the Congress a report on all standards to be initially applied in carrying out the provisions of the Highway Safety Act. Among the standards was one entitled Motorcycle Safety, the purpose of which was stated as, "To assure that motorcycles, motorcycle operators and their passengers meet standards which contribute to the safe operation of their vehicles and protection from injuries." The standard provided that each state shall have a motorcycle safety program providing as a minimum that, "...each motorcycle operator wears an approved safety helmet and eye protection when he is operating his vehicle on streets and highways". And that "...each motorcycle passenger wears an approved safety helmet, ..."

By 1974, forty-seven states, the District of Columbia, and Puerto Rico had enacted comprehensive motorcycle helmet usage laws. California and Illinois, two of the largest states in the union, had no law. Utah required helmet usage only on roads posted above 35 MPH speed limits.

B. SOURCE OF CURRENT ISSUE

On July 31, 1975, the Secretary of the U. S. Department of Transportation gave public notice of the initiation of sanction proceedings against the states of Illinois, California and Utah. The basis for the proposed action was the failure of the states to enact a constitutionally acceptable helmet law for motorcycle drivers and passengers, as required by Highway Safety Program Standard No. 3. In the public notice the following justification was given for the sanction proceedings:

> "The rapid growth in motorcycle ownership and use in recent years has been accompanied by an increase in the number of injuries among motorcyclists. The use of protective helmets has been found to be the most effective means of reducing fatal and near fatal injuries. The helmet's effectiveness makes state compliance with the requirements of Standard No. 3 a matter of particular urgency."

True to the language accompanying enactment of the Highway Safety Act mandatory compliance with broad Federal highway safety standards did become very unpopular. When faced with the prospect of having two of the largest states in the union incur sanctions equal to the loss of their highway safety funds plus ten percent of their Federal aid highway funds, the Congress included the following amendment in the Highway Safety Act of 1976, (P.L. 94-280, May 5, 1976).

> * "For the purpose of the seventh sentence of this subsection, a highway safety program approved by the Secretary shall not include any requirement that a state implement such a program by adopting or enforcing any law, rule, or regulation based on a standard promulgated by the Secretary under this section requiring any motorcycle operator 18 years of age or older or passenger 18 years of

age or older to wear a safety helmet when operating or riding a motorcycle on the streets and highways of that state."

In the year following enactment of this provision by Congress, approximately 18 states repealed their mandatory helmet provisions. In a number of other states, however, proposals to repeal mandatory helmet laws were soundly defeated. These include the neighboring states of Maryland and Virginia.

During the past several months, Mr. Jack O'Hara of the U. S. House of Representatives, Public Works Committee Staff has made presentations at a number of meetings of highway safety professionals. In these presentations Mr. O'Hara has stated that Congress did not intend or anticipate that states which already had enacted mandatory helmet laws would repeal them. The Congress (and the Committee Staff) felt that the legality of and the number of lives saved by the laws had been sufficiently demonstrated and that repeal would not be considered. This assumption was obviously inaccurate. During the past year, state legislatures have been flooded with publications, reports, letters and other articles challenging every aspect of the helmet, the helmet law, and governmental control.

Although some of this information is obviously emotional in nature and substance, a significant portion proports to be scientific fact, data, or studies which conflict with those used by safety professionals. The anti-helmet law forces are comprised primarily of a group of motorcyclists organized under the name of "American Brotherhood Against Totalitarian Enactment" (ABATE). Those urging continuation of the mandatory helmet provisions are represented primarily by the U. S. Department of Transportation, persons associated with the highway safety program, insurance persons and companies, and a number of health professionals. In some cases, both sides have used identical data to "prove" conflicting conclusions. For that reason, an examination of the various sources and types of data which are available is appropriate.

C. DATA TYPES AND AVAILABILITY

Several types of data are being used by both sides of the issue to demonstrate their claims and conclusions. The first, and most often used, are the general accident statistics compiled by both the states and the Federal Government. Data of this type, while valuable in defining general problem areas and evaluating certain aspects of safety problems, are not suitable for all purposes. In particular, most state and national data are not to a level of detail sufficient to identify precisely the nature and extent of the effect of mandatory motorcycle helmet laws. The major problem in the adequacy of this data is found in the level of detail collected at the sites of individual accidents. Very seldom are the reports to a level of detail that particular injury patterns can be determined. This is particularly critical to the subject of helmets and head injuries to the motorcyclists. In most cases the use or nonuse of helmets is not routinely reported. In other cases the prime cause of serious injury or fatality is not sufficiently identified as being related to the head, neck, torso, etc. A further problem is encountered in the ways data are amassed in particular states. For example, in some states a fatal motorcycle accident includes all accidents in which a fatality occurred and involved a motorcycle. This does not necessarily mean in all cases that a fatal motorcycle accident involved a fatality to a motorcyclist. Particular care must therefore be used when data between states are compared or national statistics are examined.

In some cases, before and after studies using state accident statistics have been made and conclusions drawn from the results of these studies. Conflicting conclusions can be drawn from the same study because of other factors which occurred during this study. Many states enacted their mndatory helmet laws in conjunction with other measures which would have an effect on the accident statistics involving motorcycles. Such things as a separate licensing procedure and testing procedure for motorcycle operators, subjecting motorcyclists to periodic vehicle inspection, and headlight laws, produce complex interactions which cannot be separated without further in-depth analysis and collection of data. Other factors such as the sudden influx of a number of new motorcycle riders or climate and weather differences between the states have been suggested as having considerable impact on interpretation of the data. In any case, though it may be possible to develop trends or inferences from the mass accidents statistics, it is an extremely difficult task to pinpoint the exact factors involved in movements of accident totals.

Of far more significance to the problem, are those studies which have been directed specifically towards the motorcycle accident and injuries to the motorcyclists. Although there has been no specific study of this kind conducted in Pennsylvania, there have been a significant number conducted in other states and throughout the world. Early studies conducted between 1940 and 1943 in Great Britain were devised specifically to determine if crash helmets in use in Great Britain were effective in reducing injuries. Several other studies of a similar nature were conducted during the mid 1950's in Great Britain.

Considerable work has been done in determing both the mechanics of and injury patterns caused by motorcycle accidents. Studies conducted both in Canada and California and earlier work in Japan have identified the head as one of the (if not the most) serious source of life-threatening injury in motorcycle accident mechanics. Data collected in conjunction with these studies are not generally conclusive as to the actual potential of helmet use, primarily because of the lack of an investigative design to collect comparative data on actual helmet use in traffic.

A further body of information is available from retrospective studies of motorcycle injury accidents conducted by states such as Idaho, Nebraska and New Jersey. In several of these studies, the subjective views of those involved in the accidents were solicited concerning the use of helmets.

The most definitive study of helmets in actual accident occurrence is currently underway, but has not yet been completed. Interim reports are available however from about the mid-point of the study. The study, being conducted in California by Dr. Harry Hurt of the University of Southern California's Institute of Safety and Systems Management, is using an on-scene, multidisciplinary approach to investigating and reconstructing motorcycle accidents and to investigate the actual role of helmets in actual accidents. To accomplish this the actual helmets are retrieved and special head and neck autopsies are often performed on fatalities. All members of the study team, including Dr. Hurt, are experienced motorcycle riders. An interim report, as published in Cycle News, is reproduced in the appendix along with some examples of accidents encountered to date.

Data concerning costs involved with accidents generally and motorcycle accidents in particular are available from several sources, including current dollar figures from both the American Medical Association and the Pennsylvania Medical Society.

Data concerning attitudes toward helmets and helmet laws are not available either nationally or within Pennsylvania, although each side claims to "know" what the public and motorcyclists think. The knowledge claimed is based on such statements as; "All our phone calls have been (for/against)..." or have been based on statements of organizations which profess to represent "all" of a particular population. Surveys made in conjunction with several studies have been limited to those involved in accidents, which may not be representative of all motorcyclists. No study of the opinion of the general public has been found. Such a survey has been conducted in conjunction with this analysis.

Finally there are a number of studies of various factors peripheral to the helmet question. A majority of those studies conducted in support of the anti-helmet group seem to emanate from one person, as do a number of the statistical studies and techniques used in opposition to helmets. The studies have been conducted and reported by Ed Armstrong ME (sic) who is described as an Architectural Engineer with a B.A. Major in Physics, U. of California 1951 and 52. Much of the rebuttal study of these subissues has been conducted by NHTSA either in-house or through contractors.

In general, the study and statistical work presented by NHTSA and others in support of helmets and helmet laws is of a better quality than that of the repeal forces. This does not necessarily reflect the quality of the conclusions drawn by each side however. In some cases the results of studies by NHTSA are suggestive rather than conclusive. On the other hand, some of the techniques used by the ABATE and other repeal groups are seriously flawed and the conclusions drawn are wholly unwarranted. The analysis portion of this report will attempt to identify and qualify these instances in both cases.

D. GENERAL DISCUSSION OF QUESTIONS AND GROUPING OF CONFLICTING CLAIMS

Although there have been questions about the mandatory helmet usage law since its first proposal, only in the past several years have the number and scope grown to confusing proportions. The main issue in the first seven or eight years after initial passage by most states was centered on the constitutionality of the mandatory law. This issue was properly taken up in numerous court tests.

Within the larger issue of the Federal bureaucracy applying sanctions against the states for failure to enact or implement laws or programs arose the singular issue of whether motorcycle helmet laws should be mandated. Congress has settled that specific issue by legislation without acting upon the larger issue of sanctions in general. As a prelude to Congressional action, a multitude of various issues were raised ranging from the design and construction of helmets to broad philosophical issues of personal freedom and liberty. Claims by pro-helmet groups were closely followed by counter-claims by anti-helmet groups which were further rebutted and so on.

To provide some order to an analysis of the issues and claims it has been necessary to define six broad issues and assemble the various pro and con claims within these issues.

1. Effects of Helmets - Although data supporting the contention that helmets can protect the head from serious damage were presented at the time mandatory helmet laws were initially considered, those opposed to helmet laws have recently raised issues that the helmets in use are of little or no value in protecting the head. Among the claims made are that the specifications and testing procedures are not adequate and that the quality of the majority of helmets being marketed is inadequate, not even meeting the inadequate specifications.

Irrespective of the above, opponents of helmet laws have contended (without qualification) that helmets cause serious injuries or death in motorcycle accidents, primarily through action of the helmet on the neck and spine. Claims have also been made that protection of the head is insufficient in the general pattern of motorcycle accidents, implying that the motorcyclist would die from other causes anyway.

A further claim is that the wearing of helmets contributes an increase in accidents through a variety of harmful features. Among the reasons given are that the vision of the motorcyclist is severely restricted and that hearing is impaired to the point where these lowering of senses actually contribute to or cause accidents. The additional weight of the helmet has been claimed to cause operator fatigue and excessive neck strain producing accidents. Overconfidence of the helmeted motorcycle operator is also forwarded as a source of accident causation. It is claimed that a false sense of security is given by the helmet leading some to take more risks in riding. These claims are all countered and rebutted by those favoring the helmet law. A number of studies have been directed specifically at both the vision and hearing impairment issue.

2. Effects of Mandatory Helmet Laws (or repeal of) - The major issue is the effect on fatalities and injuries caused by the passage or repeal of mandatory helmet laws. Using mass accident data, there have been many "studies" produced which conclude that the enactment of a mandatory helmet law produces a decrease in fatal and serious injury accidents, and that the repeal of such law has produced a significant increase. Opponents of the mandatory law have, by using different treatments and interpretations of the same data, concluded that the helmet laws have no effect on the accident picture or (in some claims) actually increase motorcycle deaths.

Among the subissues and claims raised, which may or may not have a real bearing on the above, is the contention that upon enactment of a mandatory helmet law, ridership (or licenses and registrations) decrease. Another contention is that a significant number of riders continue to operate without using helmets. Also it is claimed (as a corollary) that any decrease in fatalities noted (in many states) was due to a decrease in new (and therefore inexperienced) riders occurring at the time of enactment.

It is claimed, based on initial data from states which recently repealed mandatory helmet laws, that such repeal has seemed to cause as much as 20% more motorcycle fatalities. The claim has been highly conditioned, however. Opponents of the helmet law have criticized this claim, amplified on the conditions and pointed out additional hypotheses, while not questioning the basic data or numbers.

3. Constitutionality of Helmet Laws - The issue defined is whether the states are prevented from enacting a particular type of law, either by their own or the U. S. Constitution. Most arguments against the mandatory helmet law in this area are based on the state's right to require a person (in this case a motorcyclist) to protect themselves from death or serious injury. Some other points have occasionally been raised, such as whether U. S. DOT has been correctly given the authority to require mandatory helmet laws or whether the helmet law abridges religious freedom and the like. The issue here goes only to rights, not whether or not those rights should be exercised.

4. Societal Costs - It is claimed that significant costs to society are incurred by accidents in general and accidents to unhelmeted motorcyclists in particular. These claims have been countered and called completely false by those opposing the helmet laws who contend that there are really no costs to society and most people have insurance or workers compensation, etc.

5. Discrimination - It has been claimed that motorcyclists, as a group have been discriminated against as a class of traffic particularly since automobile drivers have not been subjected to a similar helmet requirement and the mandatory wearing of seat belts. This claim is generally countered by the argument that motorcyclists have been identified as a high risk group.

6. Public and Motorcyclist Attitude - It is claimed that almost all motorcyclists are against the mandatory wearing of helmets. Several studies have suggested a majority of motorcyclists support mandatory helmet laws at least in some states. No specific claims have been made concerning the attitude of the general public, although some have suggested that the public is apathetic of the issue. If, for completeness, it is assumed that societal costs are involved, the public (non-motorcycling) attitude is a significant issue.

These, then, are the issues which will be analyzed further using, primarily, material furnished by both pro and con supporters together with such other information as is available.

II. ANALYSIS OF CLAIMS AND DATA

A. ON THE EFFECTS OF HELMETS

1. Helmets in the Prevention of Injuries and Death

The claim for the effectiveness of helmets in preventing and/or reducing head injuries in motorcycle accidents apparently originated with the early 1940's British study by Dr. Hugh Cairns. Dr. Cairns performed in-depth studies of 106 motorcycle accidents which included the type of injury and the severity of injury for each case, in addition to study of the helmets used. The results of his study indicated a one-fourth reduction in the frequency of fractured skulls through helmet use and a reduction of one-half in the incidence of hospital-treated injuries for helmet users. A 1956 continuation of this work, by Lewin and Kennedy in Britain, examined 690 motorcyclists admitted to hospitals as a result of motorcycle accidents and obtained similar results. Proposed criteria for the design of an effective helmet were also developed. In 1957, a full statistical study of 7,010 motorcyclists by Chandler and Thompson documented a 30 to 40% reduced chance of head injury if a helmet is worn. The study considered both urban and rural-type accidents.

The fact that head injuries comprise a significant portion of the causes of death and serious injury in motorcycle accidents has been well demonstrated in studies conducted by Najumura in Japan; Newman and Webster in Canada; Hight, Siegal and Nahum in California; Drysdale, et al of the School of Medicine at the University of California at Davis; and Karus, et al at John Hopkins University.

It would seem a logical conclusion based on the combination of the overall results of the series of studies cited above that wearing helmets should play a significant role in the reduction of fatalities and injuries in motorcycle accidents. This conclusion has been challenged by those opposed to helmet laws. The published statements in opposition to the above consist primarily of flat statements that helmets actually cause accidents, or that improperly worn helmets do not prevent injuries and can actually cause injuries or that state accident statistics fail to demonstrate that helmet laws are effective. These types of arguments are not directly related to the basic question of whether helmets can and do prevent head injuries and they are discussed under the appropriate questions below. One claim of helmet ineffectiveness by Ed Armstrong, is accompanied by a detailed discussion of high school physics equations and pipe formulas in relation to the testing specifications for motorcycle helmets. This analysis was sufficiently detailed that its conclusions have been repeatedly cited by others, without question.

Mr. Armstrong's analysis unfortunately fails on two counts. The attempt to relate laboratory testing procedures with the complex kinematics involved in actual accidents by using simple high school physics is not valid. The interaction of the head/helmet system when combined with the complex action of the object being struck by this system requires higher mathematics and computer analysis to even approximately describe. For example, Mr. Armstrong attempts to equate the 13.5 mph impact of helmet test rig with a crash involving a motorcycle traveling at 13.5 mph. This direct comparison is not valid since a motorcyclist will consume a significant amount of the energy and velocity in drag while leaving the cycle. Also it is seldom that the motorcyclist hits a completely rigid and non-energy absorbing body. The simplistic formula $D=\frac{1}{2}vt$ is wholly inadequate to describe an actual accident contact, but is probably sufficient for testing purposes under strict laboratory conditions.

On an empirical basis, Mr. Armstrong's analysis fails because it does not correspond to what has been observed in numerous accidents studied over the past 40 years. Mr. Armstrong at the start of his discussion poses the initial question, "Why aren't helmets in general going to save heads in accidents?" Yet in case after case investigated, the helmet has done just that. A sampling of such cases is contained in Appendix B.

Mr. Armstrong does correctly state that the helmet is not designed to prevent injury or death in every case. This statement can be made about any piece of safety equipment or safety measure. The relationship of such a statement to the issue of whether helmets in general prevent injury or death is obscure, at best.

A further argument used by Mr. Armstrong and ABATE is that a 1972 sampling of helmets sold (or on dealer shelfs) were not up to Z-90.1 standards. This survey was apparently correct in its conclusions. It has been of equal concern to safety professionals. The highly variable quality of helmets (and differences of cost) which were perceived to correspond to variable degrees of protection for the motorcyclist has been the subject of numerous articles and papers. It has come as a surprise to all concerned, therefore, that the interim results of Dr. Hurt's studies indicate little, if any, differences in the protection offered by "dime store" and high priced helmets in street accidents. The degree of protection is apparently dependent on how much the helmet covers, not how much it costs. In Dr. Hurt's words:

> "If you value your brains, get a full-face and protect your good looks as well. A helmetless head on a pavement is like a watermelon. I don't need to carry the analogy further."

2. Helmets as a Cause of Death and Injury

Russ Sanford, in a opinion article entitled "Your Government is Trying to Kill You!" published in the August, 1973, issue of Road Rider magazine, states:

> "Statistically, it can be proven that the wearing of a motorcycle helmet is more apt to kill you than it is to save your life."

Mr. Sanford's proof, facts and conclusions following this pronouncement consist primarily of manipulations of mass accident data from several states. As stated in the Data Background Section (I.C) above, the use of mass accident data to reach conclusions concerning helmet effectiveness or ineffectiveness is inappropriate irrespective of the pro or con position. Among the problems associated with the use of this data is the recording of the cause of death by Medical Examiners. The expertise of County Medical Examiners and/or Coroners varies considerably between counties and states. It is not uncommon for only the most obvious to be recorded particularly in summaries. In any case, in-depth studies of motorcycle fatalities, previously discussed, have shown that the motorcyclist fatality is often the result of trauma to more than one particular area of the body. Statistics, such as those cited by Sanford, are therefore suspect when individual categories (i.e. head injuries, neck injuries, etc.) sum up to only 100%, rather than the expected figure of over 100% indicating multiple fatal trauma. The study by Hight, et al states, "Non-ejected occupants will often sustain two or more fatal lesions from very high deceleration rates encountered by direct body contact with the sides of vehicles". For example, the percentages of severe and fatal injuries observed for the total non-ejection cases were as follows:

Head, face, brain	53%
Neck, shoulder	0%
Thorax	31%
Arms	11%
Abdomen	23%
Lumbar region	3%
Pelvic girdle	11%
Legs	33%
Whole body	0%
Total =	165%

Note that the sum is considerably above 100%. Similar, though somewhat less frequent multiple trauma was found for ejected and deflected motorcyclists. Note also that in this category, which included both helmeted and non-helmeted operators, the incidence of serious or fatal neck injuries was zero.

Anti-helmet literature places much emphasis upon an article appearing in U.S. Navy Medicine, by CDR. E. J. Colangelo, MC USN, reporting on a fatality attributed to an aviator's helmet striking an object upon ejection. Ed Armstrong quotes a sentence from this report defining "The Hangman's Noose Analogy" and briefly summarizes the injuries received. Unfortunately, others have quoted only the analogy without further explanation. The relationship of CDR Colangelo's observation of one incident in aviation to the helmet issue is not certain.

There is no question that there is risk involved in the improper wearing or maintenance of the motorcycle helmet. A helmet which does not fit properly or is worn with a loose chin strap can be ineffective in preventing injury and can itself contribute to injury. Citing several accidents in which a helmet, improperly worn, contributed to injuries, those opposing helmet laws have in some cases presented these as a reason for not wearing helmets. Such arguments are, of course, illogical and spurious in that the same can be said for any protective equipment and the motorcycle itself. The improper use of anything generally entails some risk of some kind.

Improper maintenance of a helmet can also contribute to ineffectiveness and give the appearance that injury was caused by or in spite of the helmet. One particularly common case of improper care noted by Dr. Hurt's study has been dubbed "Sissy-bar damage", and is caused by improperly jamming the helmet on the top of a U-shaped bar extending upward from the rear of the cycle. This type of improper storage crushes the rigid foam lining found in many helmets. Once crushed, the helmet loses most of its effectiveness in the area. Dr. Hurt also states that in the approximately 500 accidents investigated by the team there has been no instance of helmet-caused accident or injury.

Ed Armstrong attempts to prove that helmets kill because the U.S. DOT concentrated on helmets and helmet laws instead of requiring training. This argument has no real bearing on the worth of helmets, per se, and will not be discussed further.

At a recent (April 14, 1977) conference of the American Medical Association, called specifically to review and discuss the Medical Aspects of

Head Protection for Cyclists, the following conclusions were published in a draft report issued May 10, 1977. (See Appendix C-2):

1. "There is no evidence to indicate that motorcycles cause the spinal injuries that are occasionally found in helmeted cycles." "... cervical spine injuries are possible, whether or not the cyclist is wearing a helmet, depending on the circumstances of the accident, but helmets do not of themselves contribute to or worsen the injury.

2. "Based on the evidence, the likelihood of neck injury caused by the helmet is almost impossible."

3. "Clinical examination of cases involving clavicle injuries indicates that these result from the elbow or arm impacting with an exterior object, thus forcing a transfer of energy to the clavicle. The injury patterns in these cases show clearly that such injuries could not be caused by the helmet."

4. "There is no evidence to support the contention that a helmet, if properly fitted and properly worn, causes head or neck injury as a result of head rotation. Rotation of the helmet itself on certain types of impact was considered. This situation can be a problem in identifying injury attenuation, because in some cases, it may appear that the helmet caused the injury, when, in fact, the helmet rotated, exposing the head to injury, and then rotated back to cover the injury. This may occur when the chin strap is worn loosely or is unfastened.

5. "There was consensus that the chin strap, as presently designed, is not a causative factor in neck injury, if properly worn." "... there is evidence to show that, even at a breaking strength in excess of 600 pounds, which is greater than the force experienced in motorcycle crashes, the most significant injury will be a minor abrasion."

3. Helmets as a Cause of Accidents

A number of hypotheses have been stated as reasons why helmets cause accidents. These include limitations of vision and hearing, helmet weight causing fatigue, and a sense of false security instilled by helmet use.

No evidence relating to actual crash experience is presented to support these claims. In the latter two cases, no evidence at all is presented, merely the hypotheses. In the case of vision and hearing limitations, Ed Armstrong performed several admittedly "back-yard" tests of both hearing and vision limitations. In the vision test Mr. Armstrong found that ".. that for me, with my helmet, there was essentially no loss of peripheral vision". However, he then concluded that "The rider must decide if he wishes to risk wearing an accident-provoking partial blinder for whatever protection it may offer after an accident has occurred". His conclusion does not appear to match his observation.

A study of the visual limitations on subjects in a fixed head position was conducted by Gordon and Price for NHTSA. Their conclusion was that although some limitation was present, all helmets tested exceeded 140 degrees total "peripheral" view in the horizontal plane.

Some concern has been expressed over the effects of head movements and these small vision limitations. Several things, however, should work toward negating any theoretical problems which might exist. First, the use of rear-view mirrors is recommended on motorcycles. While it is true that the motorcyclist has potentially a much less impeded visual field than the common passenger vehicle or truck, the motorcyclist can gain increased observation time and space with a mirror by eliminating the time to turn his head to the rear and return to the forward position. This extra time could be significant in preventing rear-end encounters in heavy traffic.

Second, it has been found in the on-going in-depth accident investigation studies conducted by the University of Southern California that the great majority of crashes occur well within the 40 degree field of vision directly in front of the motorcyclist. This tends to confirm the findings of Newman and Webster in which only 1.5% of the accidents observed involved a vehicle striking the motorcycle from the rear and a maximum of 17.5% involved a vehicle to the side (sideswipe) with the relative position of the motorcycle and other vehicle not stated.

The conclusion of the American Medical Association Conference is:

> "Should the field of vision be extended in present day helmets? The group felt that such extention would add to the injury rate; since it would be necessary to cut away a larger amount of the helmet, thus affording less protection to the crucial upper facial and temporal areas."

Hearing tests performed by Mr. Ed Armstrong in his backyard produced a similar conclusion as those conducted at The Speech and Hearing Clinic of the University of Utah cited by Mr. Armstrong. Both concluded that the helmet reduced the ability to hear noises and the ability to accurately detect the location of the noise. Unfortunately both tests were conducted in the absence of any ambient noise levels which does not accurately portray the environment in which the helmet is actually used.

Further tests conducted by the University of Utah after Mr. Armstrong's article in the April 1976 issue of Traffic Safety magazine, have concluded that by reducing the noise produced by air flow around the head, helmets make it easier for the wearer to distinguish warning signals in traffic (see Appendix C.3). These later studies confirm theoretical work done by Henderson for NHTSA which pointed out that "... with reference to any other sound of potential interest to a motorcycle rider, the critical factor in determining whether or not the sound will be heard is the amount of masking noise generated by the motorcycle, not whether the driver wears a helmet".

Returning to the fatigue and over-confidence issues, the American Medical Association Conference concluded that:

> "The possibility of rider fatigue caused by strained neck muscles resulting from heavier helmets was raised. It was pointed out that it is important for a motorcyclist to move his head back and forth continually to stay abreast of the changing traffic environment, but the helmet weight is not sufficient to cause a significant accident potential. In addition, although we do not

know of any research to document the effects of heavier vs. lighter helmets, there are numerous case studies and personal interviews indicating that riders are able to accommodate easily to any helmet within a several pound differential, and do not experience problems directly related to helmet weight."

Dr. Hurt, in his USC study, has found very little evidence of risk-taking by the motorcyclist as a contribution to cycle accidents. Other than this incomplete report, there is no evidence to support or deny the over-confidence hypothesis.

B. ON THE EFFECTS OF MANDATORY HELMET LAWS

Generally both sides of the Helmet Law controversy have leaned heavily on mass accident data and registration figures. As discussed in section I, this is unfortunate as the same data are used by both sides to "prove" or "disprove" their respective points by varying or expanding upon the data investigations. Much of the information reviewed for this report consists of critiques of or rebuttals to NHTSA data reports or statements based on data which is suggestive but not conclusive. In most cases, the original NHTSA statements were well qualified with statements indicating that the information was not conclusive. Many articles were produced to rebut NHTSA data releases. The rebuttals generally concluded that the changes in trends or data were caused by other factors. In most cases, the conclusions reached by those in rebuttal were not qualified but were forwarded as facts and reasons. Phrases such as "Totally explainable", "necessary interpretation", "real reason", "It is obvious", and similar statements have been commonly used in conjunction with analyses and interpretations of data by those opposed to helmet laws. In no case were the explanations given any more logical or valid than those forwarded by NHTSA or others in favor of the helmet laws and in a few cases analysis was based on improper manipulation or analysis and some conjectures of the data presented.

Two general effects of the helmet laws will be discussed. The first concerns claims relating to use of helmets and ridership and the second to the effects of helmet laws on accidents, injuries and fatalities.

1. Effects on Riders - The effect of a mandatory helmet law on the use of helmets by motorcyclists has been demonstrated by surveys and observations. Comparisons between states have indicated that, where enforced even at relatively low levels, the use of the helmet increases to approximately 95% or more of those riding on the streets. This compares to usage in states never having a helmet law of approximately 35% on a voluntary basis.

The question of helmet usage is of significance to the question of the effectiveness of helmet laws. In almost every case where mass accident statistics have been used, the actual usage of helmets is unknown. Most before and after analyses centering around enactment of a helmet law have been conducted without the benefit of information on actual changes in wearing habits. In many cases where estimates of wear before and after have been given, they have been based on a population of accidents only and not a general population as such.

In recent analyses which compare before and after statistics centered around the repeal of a helmet law, actual helmet usage has likewise not been considered. It has been suggested that the true impact of helmet law repeal may not become evident for several years after the actual repeal of a law which has been in effect for some length of time. It is hypothesized that there is a gradual tapering off of helmet use by the majority of wearers who have become accustomed to wearing them under a mandatory helmet law which has been enforced. If true, this could have implications for the measurement of the effects of repeal and the length of time data should be collected and analyzed. It is possible that many cyclists would continue to wear helmets at least some significant portion of the time until lost or damaged.

A further confounding factor concerning helmet use has been observed in the U.S.C. study being conducted by Dr. Hurt. In his investigations of motorcycle accidents, about 90% of those who were not helmeted at the time of their accident, stated that they wear helmets on long trips and similar occasions but not generally on short jaunts to the store. If this is a general pattern, the use of mass accident statistics could be further misleading.

These problems will be discussed below in regard to various claims made in relation to the effect of helmet laws on accidents and motorcyclists attitudes.

A claim has been made by members of ABATE that enactment of the mandatory helmet law discouraged ownership of and use of motorcycles in Pennsylvania. The basis of this claim is apparently the drop in the rate of motorcycle registrations during the year 1968, and several of the following years. It has been claimed that many riders did not register or reregister their motorcycles because of the requirement to wear helmets. While no evidence exists to prove or refute this claim, there are several alternate explanations for the slowing up of registrations. Among the other factors which may have produced or contributed to the decrease in new registrations are the enactment of a special license and testing for motorcycle operators and several amendments to the equipment provisions (handlebars, fenders, etc.) which may have made some motorcycles difficult to legally register or pass inspection. It is highly probable that these factors had a much greater impact on the decision of a motorcyclist to register his equipment than the helmet law per se. This is particularly true for those whose intended use of the motorcycle was primarily for "dirt" or trail riding (recreational purposes) where no license or registration would be required. For this type of rider, the extra effort and expense of full compliance with both operator and equipment requirements for street use was probably not worth the bother.

2. Effect on Injuries and Fatalities - Two general areas will be discussed, the effect of enactment and the effect of repeal. Although they should be related, for several reasons discussed previously, they will probably have different types of impact, and require different analysis and interpretations.

Most claims relating to the effects of enactment of mandatory helmet laws have been based on retrospective studies of mass accident statistics, i.e. aggregates of the numbers of fatal and injury accidents and/or fatalities and injuries involving motorcycles. Several examples of this type of study and the conclusions drawn will be discussed. NHTSA, ABATE, the American Motorcyclist Association and others have used aggregates and comparisons of state statistics to demonstrate positive effects, no effects or negative effects on the accident rates. Most studies suffer from the same errors of assumption and uncertainties. One primary factor which makes such comparisons tenuous is the lack of uniformity of definitions and techniques used among states. The use of Fatal Crash Rates, whether compared to motorcycle registrations or total motorcycle accidents is complicated by the differences in defining or reporting a fatal motorcycle accident. Some states consider any crash or accident involving a motorcycle in which a fatality occurred a fatal motorcycle accident. This would include accidents in which a person other than a motorcyclist was killed. Other states consider fatal motorcycle accidents as those in which a motorcyclist was killed. Attempts to adjust for this and other types of inconsistent reporting involve the use of broad assumptions and estimates which tend to detract from the validity of the conclusions drawn from the analyses. As an example - a staff memorandum published by NHTSA (DOT HS 820-097, December 1970) compared aggregate fatal crash rates per 10,000 registered motorcycles for states with and without helmet laws over the period 1966-1970. The memorandum concluded that states with a helmet law in effect experienced a 20.8% reduction in the fatal accident rate while those without helmet laws experienced only a 12.2% reduction. Given the number of assumptions and estimates used in arriving at these figures, a determination of their accuracy would be conjecture, at best.

On the other hand, analyses performed by anti-helmet law groups, such as ABATE and the American Motorcyclists Association suffer from similar deficiencies. For example, an undated (probably mid 1976) paper of the American Motorcyclist Association entitled, "Factors to be Considered in Connection with Legislation Repealing Mandatory Motorcycle Helmet Laws" (See Appendix B.2) forwards a before and after analysis of 18 states which enacted helmet laws. The analysis was limited to 18 states in an attempt to eliminate some of the variables between states. At least one of the states chosen (Pennsylvania) was selected in error as information concerning actual motorcyclist deaths was not available in the "before" period, only fatal accidents involving motorcycles. The analysis was made based on the ratio of the number of fatalities per 100 motorcycle accidents ("f/100a"). A number of techniques were used to attempt to limit the variability including the elimination of states which did not have at least three full years of helmet law and dropping the year of enactment if the effective date was other than the first day of the year. Further, an attempt was made to eliminate those states which "changed recording procedures (from rural accidents only to urban and rural, for example) or that rounded off or estimated figures" etc.

The techniques used and analysis made in the American Motorcyclist Association study should have produced an excellent indication (not proof) of the effects of the helmet law enactment. Unfortunately, at least one very important variable was apparently not considered when selecting the base of the rate (i.e. total motorcycle accidents). While changes in "recording" procedures were eliminated, there was apparently no consideration given to changes in "reporting" requirements in the states selected for analysis. Therefore, a review of the laws of the 18 states determined that 17 of the 18 had significant changes in the level of reporting required during the period of analysis. A change in the level of reporting can produce significant changes in the total number of accidents from year to year and over the period of analysis. For example, the state of New Hampshire changed accident reporting levels at least twice since enactment of their helmet law. Prior to 1971 only accidents involving damage of over $50 were required to be reported; between 1971 and 1973 the lower limit was $100; and in 1973 the level was again raised to $300. Oregon changed reporting in 1969 from "any" accident to only those over $200 property damage making "before and after" enactment comparisons invalid if based on total reported accidents.

A further problem with this analysis is the uncertainty of the type of law in effect. At least three of the states included in the analysis had helmet laws limited by the age of the motorcyclist, Oklahoma and Kansas to those under 21 years of age and New Mexico to those under 18 years of age holding a restricted license. Kansas eliminated the age restriction in 1972 as did New Mexico in 1973. The age limit in Oklahoma remains unchanged. The numerical effects of including these three states in the analysis cannot be determined. At any rate, their inclusion is inappropriate because for most of the comparison period they were not truly, full "helmet law" states.

A fourth state included (Nebraska) is probably not a true "helmet law" state. Although a law is in effect in Nebraska, it is obvious from surveys conducted by the Nebraska Department of Roads that the law is not really being enforced. In a population of 481 motorcycle accident victims surveyed (1974) 70% were not wearing helmets.

The analysis by the American Motorcyclist Association illustrates the apparent futility of the use of mass accident data to reach conclusions about specific actions dealing with a segment of the accident picture. Despite considerable efforts to eliminate variables and the use of apparently valid statistics and techniques, the numerical results are still highly questionable and the conclusions unwarranted.

A different type of study, performed by Rich Halverson (Appendix B.2) and using both Pennsylvania and U. S. accident statistics, attempts to demonstrate that any decrease in the Pennsylvania motorcyclist fatality (or fatal accident) and injury (or injury accident) rates is the result of increases and decreases in the number of inexperienced riders and not the helmet law. The technique used is to compare percentage changes in registrations to percentage changes in accidents. While the initial hypothesis, (i.e. that the number of inexperienced operators should affect the number of accidents) is probably a good choice for examination, Mr. Halverson has not presented valid information to demonstrate that this, in fact, has occurred in Pennsylvania or the U. S. in general. Some validity is lost in the use of changes in registrations as a proxy measure for the number of inexperienced operators. This is necessary, however, because of a lack of information on the actual number of motorcycle operators in Pennsylvania.

Of far more significance to the validity of conclusions is the improper use of percentages of annual change as a measure or rate. An examination of the data from which the percentages were calculated indicates the flaw in this approach (Table 1). For registrations, an increase of about 58% is shown for 1964 to 1965 and an increase of about 26% to 27% for 1972 to 1973 and 1973 to 1974. The actual number increases for these periods were 27,900 for 1964 to 1965, 47,954 for 1972 to 1973 and 61,582 for the period 1973 to 1974. The period of 1973 to 1974 was the largest annual numerical increase in registered motorcycles during the years 1961 through 1976. Yet Mr. Halverson states that the "motorcycle registration rate peaked at an all time high in the mid '60's".

TABLE I

Comparison of Annual Increases in Motorcycle Registrations and Fatal Accidents

Motorcycle Registrations			
Approx. Percent Increase* and Year	Actual Numerical Increase**	Corresponding Increase or (Decrease) in Fatal Accidents**	Fatal Accident Rate Per 1,000 New Registrations
14% (1963)	3,901	13	3.33
15% (1967)	13,164	25	1.90
(1968)	13,739	2	0.15
18% (1966)	13,260	20	1.46
(1975)	54,190	16	0.30
22% (1972)	32,141	25	0.78
26% (1973)	47,954	35	0.73
27% (1974)	61,582	(8)	Negative??
30% (1971)	34,739	14	0.40
35% (1964)	12,477	(6)	Negative??
58% (1965)	27,900	39	1.40

*from Mr. Halverson's Graph (Appendix C.2)
**from Summary of Pennsylvania Motorcycle Data (Appendix A)

He then states that the rate has "leveled off". The same problem exists in the use of percentage changes of fatalities (or fatal accidents). Where Mr. Halverson shows an increase in the fatal accident rate of approximately 90% in the 1964 to 1965 period, the actual figures are 20 accidents in 1964 and 59 fatal accidents in 1965, an increase of 39 fatal accidents as compared to an increase of approximately 28,000 registrations. In the 1973 to 1974 period, there was a DECREASE of 8 fatal accidents compared to an INCREASE of over 61,500 registrations.

An attempt has been made to correlate the numerical change in fatal motorcycle accidents with the numerical change in motorcycle registrations (Table 1 and Figure 1). As can be seen in the plot of changes in fatal accidents vs. changes in registrations, no definitive pattern exists, particularly in the period after 1968. This could suggest that separate licensing and testing has has some positive effect on fatal accidents; or that helmets had some positive effects on fatal accidents; or a combination of both plus some other factors such as physical improvements to the highway environment. The available data is, however, insufficient to justify any conclusions and the actual influence of any or all of these and other factors on Pennsylvania motorcycle fatalities remains conjecture.

Even when separate bodies of statistics are available for motorcycle accidents, it is rare that sufficient information is available to accurately assess the effect of enacting helmet laws. Cause of death is infrequently available within accident reports and even when available, may be stated in less than precise terms. One study, conducted by neighboring New Jersey, has been recently reported. The study uses eleven years of data (1965-1975) including three years prior to enactment of the helmet law (1975-67) and eight years after (1968-75). The helmet law became effective January 1, 1968. Detailed analysis from source documents was made of 477 fatal motorcycle accidents in which 477 riders were killed. Table 2 lists pertinent data for the study periods. As noted, the death rate for motorcyclists decreased significantly during the period following enactment of the helmet law.

TABLE 2
NEW JERSEY MOTORCYCLE LICENSED DRIVERS
FATALITIES, INJURIES AND RATES
1965-1975

	Motorcycle Lic. Dr. (1,000)	Motorcycle Riders Killed	Motorcycle Fatalities Per (10,000 Lic. Dr.)	Motorcycle Riders Injured	Motorcycle Injuries Per (10,000 Lic. Dr.)
1965	28.0	22	7.9	1,097	391.8
1966	38.1	46	12.1	1,578	414.2
1967	45.6	36	7.9	1,475	323.5
Motorcycle Safety Helmet, Inspection-Effective January 1, 1968					
1968	49.3	29	5.9	950	192.7
1969	55.6	30	5.4	1,157	208.1
1970	70.9	46	6.5	1,613	227.5
1971	86.1	45	5.2	2,080	241.6
1972	100.5	69	6.9	2,447	243.5
1973	113.1	58	5.1	2,488	220.0
1974	131.0	54	4.1	2,600	198.5
1975	142.1	42	3.0	2,753	193.7
TOTALS		477		20,238	

Further investigation was conducted into the cause of death in the New Jersey study. Table 3 lists the results of this investigation.

1965 - 1975 CAUSE OF DEATH

TABLE 3
NEW JERSEY MOTORCYCLE RIDERS KILLED BY CAUSE OF DEATH
1965-1975

	Cause of Death		% Head
	Head Injury	Other*	Injury Deaths
1965-1967 (No helmets used)	69	26	72.6
1968-1975 (Helmets used)	157	167	48.5

*Other indicates the injury was due to other causes such as crushed chest, ruptured spleen, bleeding, etc.

From the results, it was concluded that the incidence of fatal head injuries without the helmet law would have continued to be 1½ times greater than actually occurred. The conclusions of the New Jersey study are as follows:

"A. Conclusions. During the eleven year period (1965 to 1975), covered by this study, the number of licensed motorcyclists in New Jersey increased rapidly. During this period, many highway safety programs such as driver education for motorcyclists, driver licensing and registration and improved roads, offered a substantial long-term benefit for the motorcyclists. However, the single most effective direct activity undertaken by the state to combat the rising number of motorcycle rider fatalities and injuries, was the motorcycle safety law that became effective January 1, 1968.

"The mandatory motorcycle safety law has had a very direct positive result on the reduction of motorcycle rider fatalities and injuries in the state over the eight year period during which the law was in full effect. The death rate was reduced from an average of 9.3 fatalities for every 10,000 motorcycle driver during the period before the law was in effect to an average of 5.3 fatalities after the establishment of the law. This is a saving of 4.0 fatalities for every 10,000 motorcycle drivers, or an estimated saving of approximately 40 lives in the eight year period. Likewise, the injury rate was reduced from an average of 376.5 rider injuries for every 10,000 drivers before the law was in effect to an average of 215.7 after the establishment of the law. This is a saving of 160.8 injuries for every 10,000 drivers, or an estimated saving of approximately 30,000 injuries during the eight year period.

"The "cause of death" analysis of motorcycle rider fatalities, over the eleven years, shows that the non-helmeted motorcycle riders received fatal head injuries one and one-half times more often than helmeted riders; a strong indication that the motorcycle safety helmet reduces the frequency of head injury fatalities.

"The only substantial and direct factors introduced in New Jersey during the time of this study, were the use of the motorcycle helmets and the requirement for inspection of all motorcycles. Most of the reduction of fatalities and injuries substantiated in this study is attributed to these two factors."

Of further interest and of direct bearing on the helmet law issue is the age of motorcyclists killed. Table 4 is reproduced from the New Jersey report and portrays a pattern similar to that found in Pennsylvania and most other states:

TABLE 4

NEW JERSEY MOTORCYCLE RIDER FATALITIES BY AGE 1965-1975

(YEAR)

AGE	65	66	67	68	69	70	71	72	73	74	75	TOTAL
17	3	4	2	5	2	4	6	8	6	11	2	53
18	1	8	4	2	4	4	2	7	4	3	2	41
19	1	4	3	1	4	6	6	4	5	6	8	48
20	2	4	4	1	0	5	4	9	10	4	2	45
21-30	12	18	16	13	16	15	18	34	25	22	19	208
31-40	1	3	5	3	1	4	7	6	6	5	7	48
Over 40	2	5	2	4	3	8	2	1	2	3	2	34
TOTAL	22	46	36	29	30	46	45	69	55	54	42	477

Source Files - Bureau of Accident Records, New Jersey Department of Transportation. All useable motorcycle fatal crashes.

As can be seen, a significant portion of the fatalities over the eleven year period were adults. 89% of the fatalities were age 18 or older and 61% were age 21 or older. This pattern is consistent over the entire period.

It is, therefore, difficult to assess the potential impact of limiting the helmet mandate to those under the age of 18 years. It could be speculated, however, that limiting the helmet law to only those under 18 years old would produce an effect on motorcycle fatalities which would be little different then total repeal, as less than 11% of the fatality ages would be covered.

Another study, similar to that conducted by New Jersey, was made in conjunction with enactment of the helmet law in Australia (Brisbane). This study also confirmed a 1/3 reduction in major head injuries after enactment (Table 5).

TABLE 5

STATE OF NEW JERSEY
HELMET USE AND HEAD INJURY
BEFORE AND AFTER MANDATORY HELMET USE LEGISLATION

	Pre-Legislation	Post-Legislation	
	Group 1	Group 2	Group 3
No. of Persons	151	38	65
No. of Helmets Used	25	34	63
Rate of Wear	16.6%	81.1%	96.9%
Major Head Injury	44	6	13
% of Group Total	29.1%	15.7%	20.0%
Minor Head Injury	58	11	23
% of Group Total	38.4%	28.9%	35.4%

Other studies of fatalities and head injuries before and after helmet law enactment (i.e. Victoria, Australia, 1964; New York State 1969; and Washington State 1969) drew similar conclusions.

Some further studies were conducted comparing several states with and without helmet laws. These studies concluded through use of fatality rates and other data that head injury severity was less in those states which enacted and enforced a mandatory helmet law. Some uncontrolled variables in the methods of collecting data and analysis preclude drawing definite conclusions from other studies. They are highly suggestive of the effectiveness of helmet laws in reducing head-injury fatalities in motorcyclists.

The question of the effect of repeal of mandatory helmet laws on fatalities and serious injuries cannot be answered conclusively at this time. There are data which suggest that a significant increase in fatalities will occur after repeal of a state's mandatory helmet law. Preliminary analysis of motorcycle deaths in six states which repealed helmet laws in early 1976 indicated an average 20% increase in motorcycle fatalities over the same period in 1975 when the laws were in effect. Two of the six states reported a reduction in fatalities (Arizona and Oklahoma) while four states (Iowa, Kansas, Connecticut, and Rhode Island) reported substantial increases. Data for Rhode Island, Connecticut and Kansas are contained in Appendix A. It can be seen that Kansas experienced an increase of 40% in motorcycle fatal accidents, Rhode Island a 70% increase in motorcycle fatalities, and Connecticut an increase of 34% in motorcycle fatalities.

During the same period (1976) Pennsylvania has experienced a significant decrease in motorcycle fatalities which continued through the first three months of 1977.

As previously discussed, the true effects of repeal of a mandatory helmet law may not be measurable on a short term basis. It is therefore, difficult to predict whether the trends in the six states discussed will continue, increase or decrease. A total of about 18 states have repealed helmet laws, to date.

Studies are underway in most of the repeal states which should measure the impact. Preliminary results will probably not be available until at least the early part of 1978. Overall effects may not surface until 1979 or later.

A detailed historical study of the effect of enactment of mandatory helmet law in Pennsylvania is not possible because of the unavailability of source documents. An examination of the data available (motorcycle fatalities, registrations, etc.) does indicate that a marked deviation of the motorcycle fatality trend occurred coincidental with enactment of the helmet law in 1968. The assignment of specific cause (or causes) to this decrease is not possible.

C. CONSTITUTIONALITY OF HELMET LAWS

The constitutionality of helmet laws was discussed in Traffic Laws Commentary, Vol. 1, No. 4, August, 1972.

"Unlike other traffic laws which are clearly intended to prevent accidents and thus afford protection to the person and to the general public, laws requiring the use of motorcycle helmets appear to afford protection only for the person who is compelled to wear the helmet. Essentially on this basis, the constitutionality of motorcycle helmet laws has been challenged in almost all jurisdictions where such laws have been enacted. These challenges have been largely unsuccessful, however. Opponents of the laws have consistently urged that such laws afford no protection to the general public so they are beyond the scope of the police power. They view such laws as an unreasonable restriction on individual liberty, asserting that it is within the prerogative of the individual to determine what risks he will assume and what measures he will employ to reduce those risks, so long as the risk does not harm other persons. In upholding motorcycle helmet laws, the courts have generally rejected the premise that helmet laws afford protection only to the person wearing the helmet. Some courts have recognized the possibility that a rock thrown by a tire might strike an unhelmeted operator in the head, causing him to lose control of the motorcycle, and that this could result in an accident in which other persons would be injured. Other courts have found sufficient public interest in the reduction of accident severity to justify the use of the police power to require using a helmet. This public interest stems from the fact that the economic consequences of a motor vehicle accident are largely borne by public funds such as insurance (auto, life, or health insurance, for example) or governmental resources (social security, for example). Also, the loss of any individual, through either a disabling injury or death, has consequences on society's productivity and its ability to defend itself. Furthermore, other persons involved in an accident, particularly those who might be deemed to be at fault, have a substantial interest, which may be both emotional and economic, in the severity of any injuries to the motorcyclist."

The constitutionality of the helmet law has been upheld in Pennsylvania (Comm. vs. Arnold, 258A.2d 885,215 Pa. Super. 444, 1969) and in at least 30 other states where high courts have reviewed the question of constitutionality. One state court, Illinois, declared the helmet law in violation of the state's constitution. The U. S. Supreme Court has, on three occasions refused to consider appeals of state court decisions upholding the constitutionality of helmet laws. In Bisenius v. Karns, 165, N.W. 2d377 (S. Ct. Wisc. 1969) appeal dismissed, 89

S. Ct 2033 (1969), the appellant challenged Wisconsin's helmet law as a restriction upon individual liberty and so exceeding the police power of the state. The U. S. Supreme Court dismissed the appeal of the State Court's decision upholding the constitutionality "For want of a substantial Federal question". The language dismissing the appeal means that the U. S. Supreme Court viewed the state court's decision upholding the constitutionality to be correct and that no substantial question of constitutionality on the merits was raised by that decision.

Some persons continue to oppose helmet laws on the basis of constitutionality citing a number of sections of the U. S. Constitution, including freedom of religion, improper delegation of powers by the Congress and the general proviso of the ninth amendment. It is doubtful that any court would seriously consider appeals based on these types of Constitutional questions.

D. SOCIETAL COSTS

Although most of the court decisions upholding the helmet laws of various states have been based mainly on the societal costs of accidents (particularly motorcycle injuries and fatalities), opponents of the helmet law continue to argue against the concept of costs to society. The following are excerpts from a discussion by Ed Armstrong, a principal spokesman for those against helmet laws. The full text is contained in his article "Helmet Laws Are Not For Protection" published in the magazine Easyriders.

> "If not wearing a helmet really does cause all the doctors and hospitals and related services to work harder and gain more money, let us rejoice that this increases the GNP and puts money into circulation."
>
> "It is completely false that money spent on motorcycle accidents or any other type of accident is a cost to society or the government. Most people have insurance at work and/or forced workers compensation through the state, or liability insurance on their vehicles and home. We pay premiums, and some of us collect. How is that figured as a cost to society?"
>
> "Let's be brutal about this. If you don't wear a helmet and you are killed on a motorcycle, or in a fall from a ladder for that matter, society saves money. Some guy on a relief payroll will be able to step up and take your job, thereby saving the relief bill."
>
> "If the courts and government are really anxious to save society money, and increase business and the GNP too, then if they believe helmets save lives they should prohibit us from wearing them. This leads to the greatest benefit of all."

The above line of reasoning, as amplified in the original, is extremely difficult to discuss in detail. It is based on common misunderstandings and a simplistic view of the economy and society. It is beyond the scope of this analysis to accurately describe the complex interactions of money flow and societal costs. Several points should be noted, however. Insurance costs (private or government) bear a direct relationship to accident experience.

The more accidents, the higher the cost of purchasing insurance. The costs of insurance are borne by the aggregate (society) not the individual (or survivors) who collect. Costs of accidents also appear as increased hospital costs to both insurance and the individual.

Currently, in Pennsylvania, motorcyclists are not required to purchase no-fault insurance. The effect of this is not known precisely; however, it appears that injuries to motorcyclists are paid by the other party (if applicable), or by the motorcyclist, if only liability insurance is purchased as is the majority of cases. It is unlikely that any motorcyclist has resources sufficient to absorb the medical costs of a major head injury without substantial insurance contributions. If no-fault insurance were required of cyclists, it is estimated that the rates could be prohibitive, particularly for younger operators.

The Governor of Nebraska recently vetoed a bill repealing the helmet law in his state noting that his state's Industrial Commission so far had spent $59,000 trying to rehabilitate a motorcyclist who suffered a severe head injury which he would have avoided had he worn a helmet. The Governor said the state was required to set aside another $77,500 for further treatment of the injured cyclist.

Head injuries are particularly expensive to treat. A study on five patients admitted to Hershey Medical Center, Neurosurgical Service, with severe head injuries (not necessarily motorcycle accidents) revealed the following:

Average length of stay - 71 days
Average hospital bill (not physician) - $24,480.20
Average physician bill - $3,909.60
Total average bill - $28,389.88

Actual length of stay - 71.4 days

(Includes no pre-hospital, rehabilitation, welfare, etc.)
In-hospital cost only

An expanded discussion of head injuries, specifically those related to motorcycle accidents, occurring over a two-year period at the University of Maryland Hospital is contained in Appendix C.4.

A question of insurance costs in relation to helmet laws has been raised by a sponsor of one of the repeal bills currently in the Pennsylvania House of Representatives. State Representative Joseph Zeller has been reported in a news article (See Appendix B.2) as noting that in Illinois, which repealed its helmet law in 1969, there was no increase in insurance rates after the repeal. This information is correct and was forwarded to Representative Zeller in a letter from a group supporting the repeal of the helmet law in Pennsylvania. Unfortunately Representative Zeller was the victim of incomplete facts presented to him. The helmet law in Illinois was enacted in January, 1968. Shortly after enactment, the law was declared unconstitutional by a lower court with respect to the Illinois Constitution. This decision was upheld by the Illinois State Supreme Court in 1968 (reported on May 28, 1969), and repealed officially in June of 1969. During this period, the law was enforced for only several months, at best. Upon the initial decision of state unconstitutionality, enforcement of the law was suspended. There was, therefore, no effective helmet law in

Illinois for any length of time. As is common knowledge, insurance rates are based on actuarial experience. It is not surprising that repeal of the helmet law produced no change in insurance rates, as the rates had no opportunity to change because of enactment. Likewise there has probably been insufficient time to notice any appreciable change in insurance rates in those states which have repealed helmet laws within the past year.

Rate information for comparisons between helmet law and non-helmet law states has not been available. It is doubtful that any significant rate pattern would result because in most states the motorcyclist is required to carry only the basic limits of property damage and bodily injury liability. Most motorcyclists, particularly in Pennsylvania, probably carry no coverage for personal medical expenses on vehicle insurance, or no-fault coverage as do other motorists.

Estimates of the cost effect of placing motorcyclists under no-fault are not available. Likewise there are no firm estimates of the cost effect of repeal of the helmet law as actual experience will determine any changes in rates. It has been suggested, however, that the combination of requiring no-fault insurance for the motorcyclist and repeal of the helmet law could place the cost of insurance beyond the reach of most motorcyclists. The validity of this conjecture cannot be assessed.

E. DISCRIMINATION OF HELMET LAWS

Opponents of the mandatory helmet law have claimed that motorcyclists, as a class of traffic, are discriminated against by a law which, theoretically, protects only the motorcyclist from injury to himself in the event of an accident. Other techniques to prevent injury to occupants, pedestrians, bicyclists and others in traffic have not been the subject of mandatory use or practice laws.

Generally, those in favor of the mandatory helmet law have argued that the helmet may serve some accident prevention function by protecting the head from flying objects which might effect the operation of the motorcycle by incapacitating or momentarily distracting the operator. This is thought to be a potential problem because of the difference in physical protection offered by the motorcycle in comparison to the automobile or truck. There is no substantial proof that this is, in fact, an accident causation problem, although the potential has been cited in several court decisions.

If, therefore, one considers only the self-protection aspect of the motorcycle helmet, there is substantial justification for the claims of discrimination by those opposed to the mandatory helmet law, particularly in Pennsylvania. There are numerous examples of proven safety devices and techniques which have not, for one reason or another, been made the subject of mandatory legislation. A significant life-saving device, the safety belt, installed in virtually all passenger cars, has not been the subject of mandatory use legislation in any of the 50 states. It has been estimated that if a mandatory safety belt law were enacted and moderately well enforced nationwide (i.e. 70% usage), approximately 11,400 lives could be saved and 643,000 injuries avoided or reduced annually. Additionally, safety belts have been demonstrated to provide some measure of crash prevention (particularly in secondary collisions) by maintaining the operator in a position of control during violent maneuvers.

Despite the enormous potential for personal safety, no state, including Pennsylvania, has approached enactment of a mandatory safety belt use law.

Several foreign jurisdictions (provinces of Australia and Canada) have enacted safety belt laws with demonstrated success. The Bureau of Motor Carrier Safety of the U. S. DOT requires, by regulation, operators of commercial vehicles in Interstate Commerce to wear seat belts. This regulation has not been well enforced, however.

Public opinion has apparently played an important role in the failure to mandate safety belt usage legislatively as it did in the elimination of the short-lived Interlock System which required (theoretically) that belts be used before the automobile would start. This factor will be discussed in Section II. F., below.

A second example of the lack of a demonstrated self-protection law is peculiar to Pennsylvania. This example concerns the duty of pedestrians to avoid placing themselves in a position of peril with respect to vehicular traffic. Prior to enactment of the Revised Pennsylvania Vehicle Code, pedestrians defined as a portion of traffic, were required to obey red signals specifically and walk/don't walk signals implicitly. The revised code, effective July 1, 1977, places no mandate on the pedestrian to obey traffic signals, particularly those relating specifically to pedestrians. This action was taken despite the fact that approximately ¼ of all traffic fatalities in Pennsylvania are pedestrians. It should be noted, that local authorities may enact ordinances requiring pedestrians to obey such signals. There is currently no statewide law, however.

The American Medical Association at its recent Conference on Head Protection for the Cyclist (discussed previously) concludes that bicyclists are in equal danger from head injury in traffic spills and accidents as are motorcyclists. Mopeds (low horse power, motorized cycles with pedals) fall somewhere between the motorcycle and the bicycle, and are also equally as dangerous to the operator as the motorcycle. The Conference recommended head protection for both types of operators in addition to motorcyclists. There is no current activity in Pennsylvania which would indicate that these two classes of traffic (mopeds and bicycles) will be required to wear protective helmets. In fact, the operators of mopeds have been specifically excluded from the mandatory helmet law in the new Vehicle Code (Section 3525(a), Act 81, June 17, 1976).

In defense of this apparent discrimination, it must be stated that the accident and fatality rates for motorcyclists are apparently among the highest (if not the highest) for all types of traffic. The National Safety Council estimates a 1974 mileage death rate of about 14.0 deaths per one-hundred-million vehicle miles as opposed to 3.6 for other forms of traffic. Motorcycles are also involved in 5.6% of all fatal accidents while representing only 3.7% of the registered vehicles. The motorcycle rate of involvement in fatal accidents in relation to total accident involvement is also apparently higher than many other types of traffic, (i.e. if a motorcycle is involved in an accident, the chances of a fatality resulting are higher than for a passenger car). On the basis of these data and others, it is apparently felt that a higher degree of self-protection should be required of the motorcyclist.

In a corollary claim, anti-helmet persons raise a quasi-discriminatory issue based on data showing that the majority of motorcycle accidents and fatalities are the result of the actions of other vehicle drivers. It is true that in collision and many non-collision motorcycle accidents the motorcyclist is more often not the "guilty" party, although, as has been pointed out in the "Hurt Study", the motorcyclist often contributes to the accident by a lack of positive action to avoid it (see appendix C.1). The general thrust of the claim is that U. S. DOT (and the states) in mandating helmet use by motorcyclists has not attacked the "real" problem of the general vehicle operator ignoring the motorcycle or failing to give the motorcyclists their legal right-of-way. This apparent failure or misordering of priorities is perceived by some as discrimination against the motorcyclist.

If the broadest meaning of the word "discriminate" is used (i.e. "to make a distinction") it is true that motorcyclists are the object of discrimination. Whether or not this constitutes "discrimination" in the negative sense of the word (i.e. "to make a difference in treatment or favor on a basis other than individual merit") is a subjective question which facts cannot, of themselves answer. It should be noted that, as discussed in section C on Constitutionality, most courts have held that mandatory helmet laws are legal and constitutionally within the police powers of government. From these decisions, it can be inferred that the helmet laws are not legally "discriminatory" in the negative sense and that the difference in treatment of motorcycle operators as a class of traffic is based on the individual merits of motorcycle operation.

F. PUBLIC AND MOTORCYCLIST ATTITUDE AND OPINION

Several surveys of motorcyclists' attitudes have been taken in the past. Of particular note was a study conducted by the Idaho Traffic Safety Commission which indicated that there were 7.67 motorcyclists strongly in support of mandatory helmet laws for every motorcyclist strongly opposed. Overall, about 77.3% of the motorcyclists who commented on the helmet law were in favor of the law.

The results of this survey were in serious conflict (at least in Idaho) with the statements of Mr. Ed Armstrong, representing ABATE in presenting the case for the anti-helmet movement, that "...many motorcyclists vehemently oppose helmet wearing and 80 to 90 percent (emphasis supplied) oppose compulsory helmet laws?" Several points should be noted concerning the Idaho survey. Although the survey was conducted in good fashion, the population surveyed consisted only of motorcyclists involved in accidents. This could raise some question as to the applicability of the results to the entire motorcycling population. Secondly, it is possible that the attitudes of motorcyclists in Idaho are not representative of those nationwide, or in other states.

ABATE, nationally and in Pennsylvania, has claimed both orally and in writing to represent virtually all motorcyclists and likewise claims to be representative of the opinion of the vast majority, if not all, motorcyclists. It is the ABATE contention that, as quoted above, the large majority of motorcyclists favor neither helmets nor helmet laws.

In light of the Idaho study, it became apparent that some confusion existed as to the true opinions and attitudes of motorcyclists, particularly in Pennsylvania, and that factual data, relating specifically to Pennsylvania, would be an important factor in consideration of the helmet law issue.

Accordingly, the Governor's Traffic Safety Council directed that a scientific survey of attitudes and opinions about helmets and the helmet law be conducted. The survey was specified to be taken of two populations, licensed motorcyclists and the adult general public.

Such a survey has been conducted during July, 1977, by Chilton Research Services under contract to the Highway Safety Group. The results of this survey detailed below confirm that the claims of ABATE are, at best, inaccurate in that 79% of Pennsylvania's motorcyclists feel that helmets are effective in reducing injuries and 55% are in favor of the mandatory helmet law.

It is also of note that the survey indicated that 92% of the adult population feel helmets are effective and 87% feel that the use of helmets by motorcyclists should be mandated.

The procedures and results of the survey are described fully in Appendix E. Briefly, the procedure entailed the use of a statistically valid random sample of the two populations. The general population was sampled using a random digit telephone number system while the motorcyclist sample was generated by computer selection of every nth licensed motorcyclist. Both samples were further refined to meet the geographic population proportions of Pennsylvania. A further random respondent selection grid was used to capture age-sex characteristic as it is actually distributed across the population.

In order to eliminate bias, the questions pertaining to motorcycle issues were given to both populations (general public and motorcyclists) within a ten question set relating to various safety issues. Each respondent was told only that the survey was to gather opinions on highway safety issues. No cueing or discussion of the issues was given in the interview. The interview forms and questions used are shown in Appendix E.

The general results of the helmet questions were:

	General Population			Motorcyclists		
	YES	NO	Don't Know	YES	NO	Don't Know
Helmet use is effective in reducing injuries?	91.8%	3.7%	4.4%	78.8%	18.4%	2.8%
Government should require Mandatory Use?	87.1%	9.9%	2.9%	55.0%	43.8%	1.2%

Detailed tabular results for the two questions concerning motorcycle helmets are also presented in Appendix E. The findings on these two questions, as reported by Chilton Research Services are as follows:

4. Do you think the use of helmets by motorcyclists is effective in reducing injuries?

The overwhelming majority of respondents in the general population replied "Yes" (92%). Only 4% believe that motorcycle helmets are not effective and 4% don't know.

In each geographic area, over 90% of the respondents think helmets reduce injuries. There is practically no difference between the number of voters and non-voters who support the use of helmets (92% compared to 90%). A slightly higher percent of females than males think helmets are important (95% compared to 88%). In addition the difference between respondents who have a motorcyclist in their household, and respondents who do not, is negligible (89% compared to 92%).

The percentage of licensed motorcyclists who think the use of helmets is effective is not as high as the percentage in the general population (79% compared to 92%). Over 18% believe helmets are ineffective, which is four times as high as the percentage in the general population. Only 3% don't know.

The motorcyclists in the Philadelphia metropolitan area indicated the lowest extent of agreement with the use of motorcycle helmets (71%) when compared to the other geographic areas (Pittsburgh SMSA - 82%; Other SMSA, Non-SMSA - 80%). The percentage of non-voters who think helmets are effective, is only marginally lower than the percentage of voters (74% and 81% respectively). All 14 of the female motorcyclists think helmets help prevent accidents while approximately three-quarters of the male motorcyclists (78%) feel similarly.

8. In your opinion, should the government require mandatory use of motorcycle helmets?

Almost 92% of the respondents in the general population think that the use of helmets by motorcyclists are effective in reducing injuries. Somewhat less (87%) think that the government should require mandatory use of motorcycle helmets. Almost 10% don't believe that the use of helmets should be mandatory and 3% don't know.

The percentage of respondents who replied "Yes" is higher for the Philadelphia and Pittsburgh metropolitan areas (91% and 93% respectively) than for the other metropolitan and non-metropolitan areas (83% and 85% respectively). An almost equal percentage of voters and non-voters believe that helmets should be mandatory (87% and 88%) and a somewhat higher percentage of women than men believe they should be mandatory as well (92% compared to 82% respectively). The difference between respondents who have a motorcyclist in their household and those who do not, is small (84% compared to 88%).

Exactly 55% of the licensed motorcyclists think the government should require mandatory use of helmets. The motorcyclists deviate from the general population to a greater extent on this issue than any other (55% compared to 92%). Almost 44% of the respondents in this group do not think helmets should be mandatory, and only 1% have no opinion.

Motorcyclists who reside in other metropolitan or non-metropolitan areas, agree with government interference (55% and 63%) more so than the motorcyclists in the Philadelphia and Pittsburgh metropolitan areas (46% and 47% respectively). Voters and non-voters are not significantly different in their attitudes (56% and 52% respectively), while the difference between males and females is quite noticeable. Almost 77% of the females think helmets should be required, while 54% of the males think they should be required.

An interesting result of the survey was the data acquired on the use of motorcycle headlights as a safety device and their mandatory use. This issue is often lumped with helmet use by those opposing the helmet law. The following table summarizes the results on this issue.

	General Population			Motorcyclists		
	YES	NO	Don't Know	YES	NO	Don't Know
Motorcycle lights on in day helps avoid accidents?	59.5%	26.2%	14.3%	77.4%	19.0%	3.6%
Government require mandatory operation of motorcycles with lights on?	55.5%	33.4%	11.1%	57.8%	40.0%	2.2%

The full tabular results for these questions are also presented in Appendix E.

The results of the survey with respect to the helmet issue indicate a positive attitude toward helmets and the helmet law by a majority of Pennsylvanians and Pennsylvania motorcyclists. Unsupported statements made by those opposed to the helmet law to the effect that a large majority of motorcyclists do not believe in helmets and do not support a helmet law are obviously not factual.

III CONCLUSIONS

A. GENERAL CONCLUSIONS

Based on the whole of the analysis, it becomes apparent that many of the issues raised and claims made are designed to appeal more to emotion than logic. That the need for protecting one's head and that helmets can provide a large measure of protection cannot be realistically questioned. There are no facts to dispute this.

A large number of claims, counterclaims, hypotheses and statements of "fact" have been made based on incomplete mass accident statistics and irroneous analysis. Much of the writing examined during this analysis is devoted to attacks on methodology of analysis and completeness of data. In some cases alternate analyses and conclusions were forwarded which were statistically unsound and unwarranted. A number of statements were made as opinions and subsequently restated as fact by others. Side issues were raised which had little or no real bearing on the helmet law. A technique often used was the quotation out of context, or the omission of statements qualifying conclusions or study data.

One particularly disturbing conclusion of this analysis is that claims of a vocal minority can be and are adopted and reissued by others with little or no question. This has apparently been the case with many issues surrounding the helmet law. In particular, the claim that ABATE and other anti-helmet groups represent the large majority opinion of motorcyclists in Pennsylvania is inaccurate.

Conclusions as to the specific issues examined are stated in the following section in the order presented in the body of the analysis.

B. SPECIFIC CONCLUSIONS

The following conclusions have been reached on specific issues. These conclusions have been reached based on examination and analysis of original material where available.

1. Effects of helmets. The fact that the human head should be protected from injury has been historically accepted. That head injury is a common cause of death and serious injury in motorcycle accidents is well-documented in research and accident investigations. That a well-designed and maintained helmet, used properly, can and does prevent head injury in many accident situations has been well documented in research and in actual accident experience. Helmet cost does not appear to be an overriding determining factor in the ability to prevent head injury.

There is no evidence that a motorcycle helmet, properly maintained and worn, contributes to or causes injuries or death in motorcycle accidents. Likewise, there is no evidence that the wearing of a motorcycle helmet causes or contributes to the causing of an accident. Vision limitations of the helmet are significant in actual operation. Limitations on the ability to hear are not a problem in actual motorcycle operation and may, in fact, be beneficial in preventing loss of hearing and increasing the probability of warning signals. There is no evidence that the slight increase in weight of the helmet contributes to operator fatigue, medical problems, or accident causation. There is no evidence that motorcyclists become overconfident by wearing a helmet and increase risk-taking leading to accidents. In fact, there is substantial evidence that overconfidence in motorcyclists is a prime cause of not wearing a helmet on short trips which leads to increased injury in otherwise minor accidents.

2. Effects of Mandatory Helmet Use Laws. There is no conclusive proof that enactment of a mandatory helmet use law will significantly reduce motorcycle fatalities and serious injuries although all available evidence is highly suggestive that this has occurred when the law has been enforced. It is doubtful that conclusive proof of the effects of enactment will ever be developed because of the retrospective nature of the studies required coupled with uncontrolled historical data. There is evidence to suggest that repeal of a mandatory helmet law can produce an increase in motorcycle fatalities and serious injuries, although there has not been sufficient time elapsed to conclusively demonstrate the actual effects. It is likely, however, that by the end of 1978, the effects of repeal (pro or con) can be conclusively demonstrated in those states where repeal occurred in early 1976.

3. Constitutionality of the Helmet Use Law. It is obvious from the decisions of both high state courts and the U. S. Supreme Court that the mandatory helmet use law is constitutionally sound, particularly in Pennsylvania. Arguments to the contrary disregard the facts.

4. Societal Costs. The death of a human in a traffic accident can and most often does produce a significant cost to society in general. Serious head injuries require medical expenditures of a magnitude beyond the personal resources of almost all motorcyclists and require significant extra expenditures by society in general through increased hospital and insurance costs and public expenditures for support and rehabilitation. The lack of no-fault insurance for motorcyclists probably increases these societal costs.

5. Discrimination of Helmet Laws. Motorcyclists are treated differently from most types of traffic by requiring the use of helmets for self-protection. This differential treatment does not appear to be discriminatory, however, as there are sufficient accident data and experiences to indicate that a particularly high risk situation exists in motorcycling which requires greater than normal efforts at self-protection. Pennsylvania motorcyclists enjoy a form of reverse discrimination in fact, in that no-fault insurance is not required of them as it is of other classes of motorized traffic.

6. Public and Motorcyclist Attitude and Opinion. Based on current Pennsylvania surveys, the large majority of the adult public (18 years and over) and a majority of motorcyclists feel that the helmet law should be retained in Pennsylvania.

C. BOTTOM LINE ISSUE

There are numerous emotional issues which are not suitable for analysis. If a determination to retain or repeal Pennsylvania's helmet use law is based only on facts, it appears that the logical conclusion is to retain the law in order to reduce accident costs to the public as a whole. By implication, the general public feels the helmet law will accomplish this.

APPENDIX A

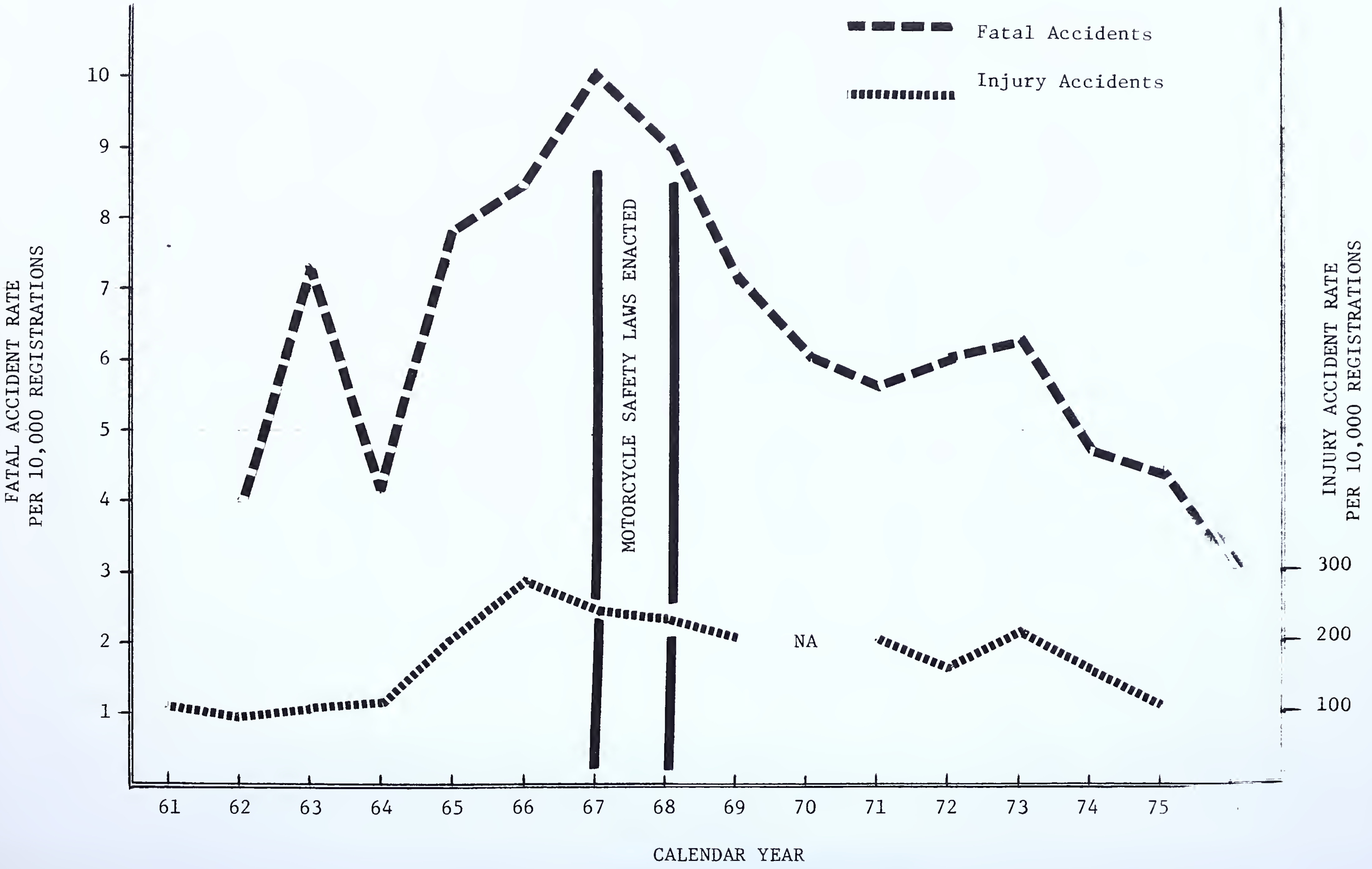
DATA TABLES & FIGURES

SUMMARY OF PENNSYLVANIA MOTORCYCLE DATA

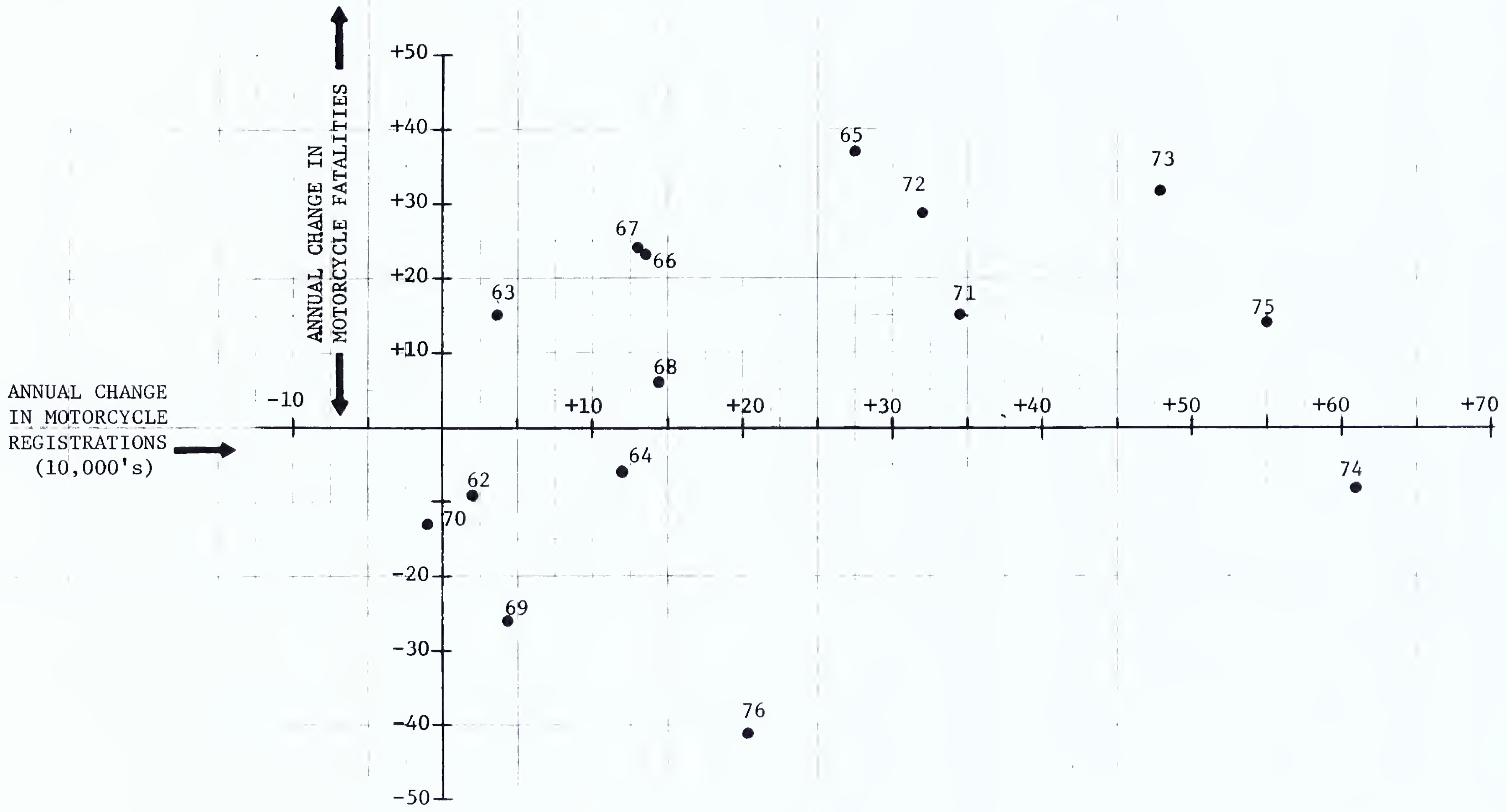
1961 - 1976

YEAR	TOTAL ACCIDENTS	FATAL ACCIDENTS	INJURY ACCIDENTS	PROPERTY DAMAGE ACCIDENTS	REGISTRATIONS
1961	459	23	331	105	30,404
1962	388	13	303	72	32,893
1963	535	26	384	125	36,794
1964	755	20	549	186	49,271
1965	1,930	59	1,559	312	77.172
1966	3,271	79	2,580	612	90.432
1967	3,055	104	2,572	379	103,596
1968	3,391	106	2,795	490	117,335
1969	2,738	84	2,365	289	117,808
1970	N.A.	71	N.A.	N.A.	116,641
1971	3,737	85	2,946	706	151,380
1972	3,822	110	3,135	577	183,521
1973	6,078	145	5.093	840	231,475
1974	5.858	137	4,859	862	293,057
1975	5.187	153	4.225	809	347.247
1976	5,043	111	4,113	819	367,751

MOTORCYCLE INJURY AND FATAL ACCIDENT RATES
1961 - 1976 PENNSYLVANIA



RELATIONSHIP OF CHANGE IN MOTORCYCLE FATALITIES TO CHANGE IN MOTORCYCLE REGISTRATIONS
1961 - 1976 PENNSYLVANIA



NOTE: ANNUAL CHANGE FOR THE YEAR INDICATED IS THE ACTUAL INCREASE OR DECREASE FROM THE PREVIOUS YEAR

FIGURE 1

RHODE ISLAND AND CONNECTICUT REPEAL DATA

On May 17, 1976, Rhode Island repealed its mandatory helmet use law. Their motorcycle fatalities for 1976 were 17 versus 10 for 1975, an increase of 70%.

Connecticut had 41 motorcycle fatalities for the entire year of 1975. They repealed their mandatory helmet use law effective June 1, 1976, and motorcycle fatalities for 1976 were 55, an increase of 34%.

STATUS OF MOTORCYCLE FATALITIES IN CONN. & RHODE ISLAND FOR YEARS 1975 & 1976

Rhode Island

Fatals - 1975	10	Of the 17 fatals in 1976, 15 did not have helmets on, one did and one was killed before law was repealed with helmet on.
Fatals - 1976	17	

Rhode Island is now determining cause of death (i.e.) head, neck, etc.

Connecticut

Fatals - 1975	41	(40 drivers, 1 pass.)
Fatals - 1976	55	(46 drivers, 9 pass.)

Connecticut investigated cause of death from June 1 to end of Sept. 1975 and the same period in 1976.

They broke down the cause of death into 4 categories; head, neck, other, unknown, and with helmet, without helmet and unknown.

FATALS

	Head Injury		Neck		Other		Unknown	
	1975	1976	1975	1976	1975	1976	1975	1976
with helmet	6	1	0	1	4	1	4	1
without helmet	4	20	0	0	0	5	5	2
unknown	0	2	0	0	0	0	0	1

(12)

KANSAS DEPARTMENT OF TRANSPORTATION
STATE OFFICE BUILDING—TOPEKA, KANSAS 66612
O. D. TURNER, Secretary of Transportation ROBERT F. BENNETT, Governor
1776 1976

May 4, 1977

Mr. Harry Palmer
Office of Highway Safety
1214 Transportation and Safety Building
Harrisbery, Pennsylvania 17120

Dear Mr. Palmer:

The following information concerning motorcycle accidents before and after repeal of the motorcycle helmet law in Kansas is being furnished you in accordance with your telephone request of April 29, 1977.

BEFORE REPEAL OF HELMET LAW

Month	All Accidents	Fatal Accidents
July 75	302	7
Aug. 75	263	8
Sept. 75	191	1
Oct. 75	170	4
Nov. 75	59	0
Dec. 75	52	0
Jan. 76	40	0
Feb. 76	97	0
Totals	1174	20

AFTER REPEAL OF HELMET LAW

Month	All Accidents	Fatal Accidents
July 76	291	5
Aug. 76	323	8
Sept. 76	231	7
Oct. 76	110	4
Nov. 76	74	2
Dec. 76	56	0
Jan. 77	11	0
Feb. 77	68	2
	1164	28

It would appear that the severity of accidents has increased considerably since the repeal of the motorcycle helmet law.

Sincerely,

Arland V. Hicks

ARLAND V. HICKS, P.E.
Transportation Safety Administrator

AVH:dh

APPENDIX B

EXAMPLES OF CLAIMS & COUNTERCLAIMS

1. Pro
2. Con

MOTORCYCLE CRASH INJURIES
&
SAFETY HELMET NEWS CLIPS

Collected by the

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

1969 - 1970

Motorcycle, 2 Autos Involved in Crashes

youths hurt

Motorcyclist, Rider Injured In Moline

A motorcyclist and his passenger were injured in a crash

Motorcycle Traffic Laws:

Motorcyclist Is Injured

Man Killed, In Cycle-Car Crash

Three Injured in Motorcycle Mishaps

Motorcycle accidents over the weekend resulted in injuries to three persons, according to information from Camden-Clark Memorial Hospital.

Accident Saturday Hurts Motorcyclist

Thrown From Cycle, Passenger Injured

Two Hurt When Cycles Collide

Motorcycle Hits Car

Motorcycle, Car Crash

Youth Injured On Motorcycle

An 18-year-old Winter Haven youth was badly bruised and skinned up after a car-motorcycle mishap near the high ... Friday noon.

Injured In Motorcycle Crash

Warren Youth Injured On Motorbike

Youth Hurt

Auto, Motorcycle One Person Injured

More Safety Gear For 'Cycles Urged

Hospitalized In County Auto, Motorcycle Accidents

A young motorcyclist and a passenger in a one-car accident have been hospitalized in separate accidents investigated by the California Highway Patrol.

In the other incident, Mark Ellis Lapins, 22, of 1368 Hanover Lane, Ventura, was driving north on Highway

Police Report

HIGHWAY SAFETY **PROGRAM**
STANDARD 3

Motorcycle Safety

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration
National Highway Safety Bureau

PURPOSE

To assure that motorcycles, motorcycle operators and their passengers meet standards which contribute to safe operation and protection from injuries.

STANDARD

For the purpose of this standard a motorcycle is defined as any motor-driven vehicle having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground, but excluding tractors and vehicles on which the operator and passengers ride within an enclosed cab.

Each State shall have a motorcycle safety program to insure that only persons physically and mentally qualified will be licensed to operate a motorcycle; that protective safety equipment for drivers and passengers will be worn; and that the motorcycle meets standards for safety equipment.

I. The program shall provide as a *minimum that:*

A. Each person who operates a motorcycle: (1) Passes an examination or reexamination designed especially for motorcycle operation. (2) Holds a license issued specifically for motorcycle use or a regular license endorsed for each purpose.

B. Each motorcycle operator wears an approved safety helmet and eye protection when he is operating his vehicle on streets and highways.

C. Each motorcycle passenger wears an approved safety helmet, and is provided with a seat and footrest.

D. Each motorcycle is equipped with a rearview mirror.

E. Each motorcycle is inspected at the time it is initially registered and at least annually thereafter, or in accordance with the State's inspection requirements (see Periodic Motor Vehicle Inspection Standard).

II. The program shall be periodically evaluated by the State for its effectiveness in terms of reductions in accidents and their end results, and the National Highway Safety Bureau shall be provided with an evaluation summary.

GPO 886-247

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
U.S. DEPARTMENT OF TRANSPORTATION
[redacted]
WASHINGTON, D.C. 20591

IN REPLY REFER TO: 42-13

January 4, 1971

While total motor vehicle deaths decreased by 1,100 during 1970, motorcycle deaths increased about 25 percent to over 2,400. This increase resulted partly from the many new inexperienced riders on motorcycles during 1970, a year in which motorcycle sales were at a record high, almost double 1969.

About 700 deaths, or almost 30 percent of the 2,400, occurred in the seven States which do not have laws requiring the use of safety helmets by motorcyclists. Additional deaths occurred needlessly from head injuries in States which have adopted helmet laws that exempt certain age groups from coverage or where the law is not being enforced because of inadequate helmet standards, lack of penalty provisions, etc.

The use of securely fastened safety helmets saves lives. This fact has been documented statistically by this and many other safety agencies. However, the news clippings in this publication show the need for and effectiveness of safety helmets far more clearly than impersonal statistical analyses.

Safety helmets save lives. I ask that you lend your support to get them used by all motorcyclists.

Sincerely,

Doug Toms

Douglas W. Toms
Acting Administrator

Enclosure

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page Edit Page Other Page

HOBBS, N.M.
NEWS-SUN

E - 8,237
S - 9,079

APR 27 1970

Cycle Mishap Injures Two Teenagers

Two Hobbs teenagers were injured when a motorcycle they were riding overturned, and two cars received damages totaling $1,250 in damages, in separate traffic accidents in Hobbs yesterday afternoon.

Warren Emerson, 14, of 1130 Copper, received multiple abrasions of the face and head, and Gary V. Moore, 15, of 909 North Gulf, sustained abrasions of the shoulder, hand and elbows, in the motorcycle accident about 1:30 p.m. in the 2600 block of West Marland. Both were treated at Lea General Hospital, then released.

Police said the 1969 Honda 90, which received an estimated $75 in damages in the accident, was traveling west when the driver, Emerson, looked behind him. The cycle hit the north curb of Marland, stayed over the curb for about 8 feet, returned to the pavement over the curb again, skidded, then flipped, throwing both riders from the cycle.

Both were wearing safety helmets, police said, which probably saved them from more serious injury, since the pavement made gouges in both helmets.

Emerson was cited for failure to use due caution.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page Edit Page Other Page

SPENCER, W.VA.
TIMES-RECORD
DEC 24 1970
WEEKLY - 4,500

Cycle Mishap Hospitalizes Neal Reed

The City of Spencer's new ordinance requiring all motorcyclists to wear a helmet while riding in the city may have already saved one life, officials at Roane General Hospital report.

Stanley Neil Reed, 16, of Ripley Road Spencer, took a spill while cycling on Dodd Drive in Green Acres Saturday, shortly afternoon.

He was taken to Roane General Hospital by a Sinnett Funeral Home ambulance and was admitted for treatment of minor injuries.

Hospital authorities said the youth had a badly scrapped shoulder and a cut knee.

A spokesman at the hospital said the youth told him that wearing the safety helmet may have saved his life as the helmet smacked onto the pavement.

Reed is a junior at Spencer High where he participates in football, basketball and baseball.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page Edit Page Other Page

HOBBS, N.M.
NEWS-SUN

E - 8,237
S - 9,079
APR 15 1970

Youth 'Fair' After Cycle Mishap Here

Gerry Alton Akin, 16, of 501 North Houston, today was in "fair" condition in Lea General Hospital, his life possibly saved by a safety helmet he was wearing when his motorcycle slipped from under him here shortly before 5:30 p.m. yesterday.

Gouges in the pavement on Sanger at Jefferson indicated Akin skidded "well over 50 feet," and the helmet bore deep gouges in both sides of its front, police said.

Akin told police he was driving east on Sanger, reached up to scratch his nose and the motorcycle hit a bump. The next thing he remembered was waking up in the emergency room at the hospital, he said. He was cited for failure to use due care.

Police described his injuries as: Severe bruises and abrasions on his right arm and shoulder; severe abrasion of the right wrist, abrasions of the left shoulder and arm; left arm broken at the wrist; laceration below the right eye; abrasion on the right side of his face; and large abrasion on his left upper lip.

Damages to the 1968 Suzuki 100 he was driving were estimated at $20.

Of course, we get nearly as much silliness from the world of motorcycling. The August '69 issue of *American Motorcycling*—the Ama's house organ—carries comment by Michael Bondy regarding the helmet laws. Mr. Bondy says that such laws are of "questionable consitutionality" and in that he is certainly correct. Unhappily, he also says helmets "impair the peripheral vision and hearing, and [impart] a false sense of security to the motorcyclist which in turn may lead to accidents." He finally charges that "the helmet may also aggravate an injury."

Nonsense, Mr. Bondy. There is no rational argument against wearing a helmet while riding. One may lose a couple of degrees in field of vision when one's eyeballs are over at full lock, but the loss is slight and may be easily compensated by turning the head. Hearing? If anything, this is improved by a full-coverage helmet, as such helmets eliminate wind noise in one's ears. The false sense of security? It is the people who feel falsely secure on a bike you see riding around bareheaded. Those with a healthy regard for their lives wear helmets. They may be able to conceive circumstances in which the helmet might possibly cause injury, but in the vast majority of falls, the helmet is an undiluted blessing. Once again I'll say that I think people who refuse to wear a helmet while riding are dim-bulbs at best—but they have a right to be as dim as they like and I will continue to defend their right. The constitution provides us with all the grounds for defense we need. Specious arguments against helmets, as such, cloud the real issue—which is the unwarranted intrusion, by government, into private affairs.

—Gordon Jennings

Dec 1969 CYCLE

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page Edit Page Other Page G11

DETROIT, MICH.
NEWS

E - 700,321
S 947,155
MAY 7 1969

Cycle deaths up without helmets

LANSING—(AP)—Safety experts reports Michigan's motorcycle death rate has taken a startling jump since a court decision wiped out a law requiring all motorcyclists to wear crash helmets.

Secretary of State James Hare and Lt. Bryce Gray, of the State Police safety and taffic bureau, agree the higher death rate can be blamed largely on the lack of a law requiring that helmets be worn.

Hare reported that in 1966, there were 104 motorcycle riders killed on Michigan highways.

This prompted the Legislature to enact a law making the headgear mandatory.

"In 1967, motorcycle deaths dropped to 88 despite a marked increase in motorcycle registrations," Hare said. "But a Michigan court then ruled the helmet requirement was unconstitutional."

Last year, without the law, the deaths jumped to 122, Hare said. Five pedestrians also were killed by motorcycles.

Gray said there have been 17 motorcycle deaths through May 1, a figure identical with the same period in 1968.

"But this is only the beginning," Gray said. "The motorcycle season is just starting. There will be more and more of them on the roads from now through October."

Hare said 40 states now have helmet laws. Reports from 30, Hare said, show a reduction in deaths. New York reports a 50 percent motorcycle death decline.

California, without such a law, reported a 9 percent increase during the same period.

Press Intelligence, Inc.
WASHINGTON, D.C.

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9 4

MEDFORD, ORE.
MAIL TRIBUNE

OCT 12 1969

E - [illegible]
S - [illegible]

Motorcyclist Is Accident Victim

A departure from the usual hospital routine occurred following an accident Saturday. Instead of a hospital spokesman giving a report on the patient's condition, Kenneth Wayne Marshall, 17, of 11919 Meadows Road, Central Point, felt well enough to report on himself over the phone.

Marshall is recovering at Rogue Valley Hospital from a broken leg and bruises sustained when the motorcycle he was operating collided with a car driven by Sammie Gail Colvin, 1024 S. Grape St., Medford, early Saturday morning. The collision occurred at the intersection of Meadows Road and Weber Road.

"I have a broken leg and a lot of scratches," Marshall said. "I was thrown from the motorcycle when we collided."

Oregon State Police investigating the accident said that the Colvin auto was northbound on Meadows Road at 12:10 a.m. when Marshall's motorcycle entered the uncontrolled intersection from Weber Road and struck the right front fender of the car. Police said Marshall was thrown from the motorcycle and noted that in their opinion the fact he had been wearing a helmet averted more serious injury and possibly death.

Colvin was cited for failure to yield right-of-way and Marshall cited for operating the motorcycle without an operator's license.

Additionally, police reported that Marshall's mother, Mrs. Jackie Marshall, was cited for allowing an unlicensed person to operate a vehicle.

Press Intelligence, Inc.
WASHINGTON, D.C.

Front Page | Edit Page | Other Page

2

FAYETTEVILLE, ARK.
NW ARKANSAS TIMES

E - 14,417

[illegible] 1969

Crash Helmet Prevents Head Injury In Wreck

A crash helmet saved a 16-year-old Fayetteville boy from serious injury Friday afternoon when his motorcycle struck the rear of a bus on Hwy. 71 south.

Dennis Keeney, 645 Government Ave., was taken to Washington General Hospital where he was treated for a fractured right arm and released following the 4 p.m. mishap in front of Mexican Original Restaurant.

Patrolman James C. Bayles said Keeney's arm was fractured when he fell to the pavement after being thrown head first into the rear of the Crown Coach Lines' bus. "His helmet saved him," the policeman said.

Frank L. Stapleton, 54, of Joplin, Mo., was driving the bus loaded with passengers. He said he felt something strike the rear of the bus and looked in his mirror to see the youth and his motorcycle lying in the road.

Fayetteville police recently began cracking-down on motorcycle safety equipment and in one day issued more than two dozen citations for failure to wear crash helmets. State law requires motorcyclists to burn their lights day or night, wear a crash helmet and a face shield or goggles, and have crash bars on their machine.

Press Intelligence, Inc.
WASHINGTON, D.C. 20001

Front Page | Edit Page | Other Page 6

BUTTE, MONT.
STANDARD

M - 23,285
S - 23,955

SEP 30 1970

Cycle, car in wreck

Steve Rodrigues, 19, of 2809 Montana was reported in good condition Tuesday in Silver Bow General Hospital after a traffic accident.

Rodrigues was injured Monday when a motorcycle he was riding collided with a car in the 3000 block of Harrison near the Butte Plaza.

Police said Mrs. Kay Piety English of Billings was leaving the shopping center and was turning north onto Harrison. Rodrigues, who suffered face and leg injuries, was riding his motorcycle north on Harrison.

Police credited the fact that the young man was wearing a protective helmet with saving him from more serious injuries.

Cyclist Killed In Va. Collision

A 20-year-old Alexandria construction worker was killed last night when his motorcycle collided with a car at the intersection of Jordan Street and Raleigh Avenue, Alexandria police reported.

The victim, identified as Herman L. Blankenship Jr., of 215 Chinquapin dr., died of head injuries which police said could have been prevented had he been wearing a helmet.

A passenger on his motorcycle and a second youth on another motorcycle were slightly injured. Charged with reckless driving was the driver of the car, Lillian T. Nelson, 20, of Morningside, Md.

Wash Post
4/8/68

Cycle Hits Deer, Helmet Saves Rider

Wilmington Delaware 6/23/69

George E. Atkinson, 20, of Middletown today has his safety helmet to thank that he's alive, according to state police.

Atkinson was riding south on Delaware 896, about a half mile south of the Interstate 95 off ramp about 1:40 a.m. when a buck deer ran directly into the path of his motoriycle.

Atkinson hit the deer. His cycle veered and skidded about 120 feet along the roadway. He suffered skinned arms, legs and hands and was released after treatment at Wilmington General Division.

Police noted, however, that one side of his helmet was flattened and a small hole torn in it from skidding on the roadway.

The deer was killed. It was disposed of by the state game warden.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page	Edit Page	Other Page

ELLICOTT CITY, MD.
TIMES
DEC 1 0 1970
SEMI-WK. - 7,174

Cycle Accident Injures Two

Two Ellicott City youths were injured Tuesday when the motorcycle on which they were riding collided with a car on Twin Rivers Road near Lynx Lane in Columbia.

John S. Bare, 19, of Evergreen Ave., Ellicott City, operating the motorcycle, and James H. Pickett, 16, of Allview Drive, Ellicott City, were traveling north on Twin Rivers Road at about 2 p.m. when their motorcycle turned left into the path of a vehicle traveling southbound on Twin Rivers, driven by Catherine A. Hoddinott, 19, of Clarksville.

Both Bare and Pickett were thrown off the motorcycle. Bare was released from St. Agnes Hospital with a fractured leg, and Pickett received treatment for lacerations and abrasions. Miss Hoddinott was not injured.

Charges are pending.

SAVED BY THE HELMETS? -- A huge black puff of smoke attracted shoppers in the Wilde Lake Village Shopping Center to the scene of a motorcycle and auto collision on Twin Rivers Road, Tuesday. The two Ellicott City youths thrown over the windshield of their cycle were wearing helmets; neither boy was injured seriously.

NO MAN AN ISLAND

My husband sells bikes for a living, and my 17-year-old son is earnestly saving for a 250-cc Kawasaki so motorcycles and your magazine are part of the scenery around here. I drive a school bus for our high school district and cover about 75 miles daily, so I have an opportunity to observe a lot of highway activity.

I wholeheartedly agree with R. Schneider (CW, Dec. '68) about protective clothing and helmets. The cost of boots, gloves, jacket, etc., is quite a hunk of cash. But when you compare it to a week's stay in the hospital, I think it evens out. Also, when you consider (as a taxpayer) what it costs monthly for one patient to "live" like a vegetable in a mental institution—who said, "No man is an island unto himself"?

The new law for a separate license for motorcycle riders, I think, is sensible. If I had the finances I would open a school to teach new riders how to handle their wheels. Why not high school driver education for cycles as well as cars?

I could almost choke kids when they cut in front of me when I'm doing 40-50 mph. But more often than not, it is the four-wheeler driver who thinks the cyclist is on a tinkertoy, and does not honor his equal rights on the road. I try to give a wide berth to both the motorized and the pedal type of cycle. I get a twinge when I read in the paper about a young person being killed on a motorcycle--but my son also skin dives, crawls down into caves and mine shafts, rides with friends in cars--well, I think you see what I mean.

MRS. MILDRED J. MILLARD
El Cajon, Calif.

June 1969

CYCLE WORLD

Press Intelligence
WASHINGTON, D. C.

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46

KALAMAZOO, MICH.
GAZETTE

E - 57,[illegible]4
S - 5[illegible],[illegible]28

JUN 9 1970

3-Year-Old Cycle Passenger Hurt In Crash Here

Timothy South, 3, of 2221 Oakcreek, injured Monday in a car-motorcycle accident on Cork Street, was reported improved today at Bronson Hospital.

Hospital officials said his condition was fair.

Timothy was injured about 8 a.m. when the motorcycle on which he was a passenger struck the side of a car driven by Dallas D. DeBoer, 16, of 1821 Sheridan, at the intersection of Cork Street and Whittier Drive, according to Kalamazoo patrolman Thomas Speers.

The boy was riding on the motorcycle in front of his father, Melvin G., who was driving when the accident occurred, Speers said.

Speers said the father was thrown over the top of the car by the force of the accident and Timothy against the side of the car.

Both were wearing protective helmets at the time, he said.

DeBoer was not injured, according to police.

ROAD RASH

About Mrs. Millard's letter in favor of helmets and other protective riding wear (CW, June '69). Let me account, briefly, an experience and let your readers come to their own conclusions.

Summers in Tucson sometimes nudge 115 F, so when it became law not to ride without a helmet and glasses, lots of riders felt an imposition and big inconvenience. Some took to World War II pots and tiny little glasses. My wife and I snapped bubble shields onto our sky diving helmets. Can you imagine being inside a bubble shield helmet in August in Arizona?

Anyway, the story goes on. I bought a Norton 750 Commando (nice). The night was to be cool, so my wife and I brought along our black motorcycle jackets, you know, the ones with all the snaps and zippers that aggravate righteous old ladies out of Tucson. Returning home on a lonely mountain road around midnight, a doe ran right in front of us. The next thing you know, we are examining the pavement real close. We both got a good sanding. My bubble shield had a hole in it you could waggle your thumb through. My helmet was almost worn through, and there are fair-sized holes in our jacket sleeves. What do you think we'd have looked like without that stuff on? Or, wearing shorts and sandals?

Then what happened? I collected Norton parts from out of the desert and we rode to the emergency ward by the light of the moon. (When they made the Norton, they made a motorcycle).

BOB SAUER
Tucson, Ariz

Jan 1970

CYCLE WORLD

LET'S BE RATIONAL

Reading of Bill Ivy's death because of a helmet failure in a crash prompts me to write in favor of head protection for riders.

On Easter Sunday of this year, I was easing into a small country town at a non-racing 30 mph when a large dog darted from alongside the road and ran directly under the front wheel of [illegible] X-6. The impact snapped the bike's [illegible] crown and left one dead dog, one [illegible] battered motorcycle, and one bruised but alive rider strewn along the pavement. My protective clothing was quite torn, but I was not. The Bell 500 TX helmet which I wore received deep abrasions over my left temple as I slid along the asphalt. In my opinion, that now ruined helmet saved my life.

If motorcyclists were to voluntarily adopt the proven safe practice of wearing helmets and devote their fighting efforts to blocking more absurd legislation, would they not find more friends in the general public? Wouldn't a general educational campaign about motorcycles do more for the sport than rantings about the constitutional right to mash one's head? We're fighting for our very existence. Isn't it time to stop the polemics and become rational promoters of a great sport?

Jan 1970 FLOYD E. BARWIG, JR.
Scotia, N.Y.

CYCLE WORLD

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page
Edit Page
Other Page

EUGENE, ORE.
REGISTER GUARD

E - 50,455
S - 50,937
JUL 26 1969

Woman Dies In Collision Of Car, Cycle

A Eugene woman was injured fatally Friday night in Eugene when a motorcycle on which she was riding collided with a car at the corner of Monroe Street and Sixth Avenue.

Pronounced dead at 12:20 a.m. Saturday in Sacred Heart General Hospital as a result of head injuries suffered in the accident was Linda Marie Pinkerton, 20, the wife of Charles Pinkerton of 859 W. Third Avenue, Eugene.

The driver of the motorcycle (Mrs. Pinkerton's brother) Steven Allen Fuchs, 18, of Rte. 5 Box 785, Eugene, was listed in satisfactory condition Saturday in Sacred Heart.

Eugene police said a car driven by Joe Rufus Jackson, 25, of 855 W. 28th Ave., Eugene, and the cycle collided at about 10:20 p.m. Friday.

The car, heading north on Monroe Street, was starting to make a left turn onto Sixth Avenue when the collision with the motorcycle, traveling south on Monroe, occurred, reports said.

Both riders on the motorcycle were thrown from the machine upon impact with the car, police said. Mrs. Pinkerton, who was thrown 27 feet, was wearing a safety helmet without a chin strap, reports said. The helmet was found 103 feet from the point of impact.

Her brother was charged by Eugene police with speeding and Jackson was charged with making an improper left turn, police said.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page ✓
Edit Page
Other Page

BOCA RATON, FLA. ✓
NEWS

APR 27 1969
3 X WEEK - 4,432

Youth dies of injuries

Thomas Musal, 16-year-old of 1470 S.W. 5th court, died about 1:30 Friday afternoon from injuries suffered Thursday evening in a motorbike accident.

Musal was the second traffic death recorded in Boca Raton this year.

Police officials said the youngster suffered fatal head injuries when his motorbike collided with a second cycle on northwest 12th avenue at 5:49 p.m. Thursday.

Injured in the same accident were Harold K. Richter, 18, 1229 N.W. 4th St., and a passenger, Bruce Tolman, 16, of 1257 N.W. 5th St. Richter was listed in satisfactory condition by hospital authorities yesterday. Tolman was treated for multiple abrasions and released Thursday evening.

Police said Musal was proceeding north on Twelfth Avenue and Richter south when Musal apparently turned left in front of the other bike.

One helmet was found at the scene. Police officials said it belonged to Musal but they were unable to ascertain whether or not he was wearing it at the time of the accident.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

Front Page   Edit Page   Other Page

AUSTIN, TEX.
AMERICAN
M - 48,058
AMERICAN STATESMAN
S -- 76,630
JUN 29 1970

Motorcycle Accident Victim Dies

A 20-year-old woman from Marshall died in Brackenridge Hospital Sunday of head injuries received in a motorcycle-automobile collision Saturday in downtown Austin.

Police said she was Miss Kay Henderson, a passenger on a motorcycle driven by Steve Crayton, 21, of 1020 East 45th St., Apartment 157, when it was in collision with a car at 4th and Lavaca Saturday afternoon.

Crayton was released from Brackenridge Hospital Saturday after treatment.

The driver of the car was not injured. She was identified by police as Ruby Nettles Noack, 62, of 1709 Brentwood.

The car was eastbound on 4th and the cycle northbound on Lavaca, police said.

Miss Henderson, in addition to the head injuries, also had fractures of both legs and was in the intensive care section of the hospital until her death.

After the collision, one protective helmet like those worn by cyclists, was found in the intersection. Police said it apparently belonged to Crayton. Miss Henderson apparently was not wearing a helmet.

Her body will be transferred Monday from Wilke-Clay Funeral Home to Sullivan Funeral Home in Marshall for funeral arrangements. She is survived by her parents, Mr. and Mrs. C. B. Henderson of Marshall.

Accident Victim Dies Hours After Wreck

Star-Telegram Mid-Cities Bureau

RICHLAND HILLS — Danny C. Williamson, 19, died at Peter Smith Hospital in Fort Worth Wednesday afternoon, five hours after the motorcycle on which he was riding collided with a car at Texas 183 and Norton Drive here.

Williamson, a mechanic who resided at 3012 Willow Park in Richland Hills, died at 1:43 p.m. from head injuries received in the crash about 8 a.m.

He was a passenger on a motorcycle driven by Jerry Ray Lambert, 16, of 7863 Davis Blvd. in Richland Hills. Lambert was released after emergency treatment at Peter Smith.

A Richland Hills policeman said that Lambert apparently was thrown into the right side of the car while Williamson was thrown over the auto onto the ground. He was wearing a safety helmet but lost it in the crash, a police department spokesman said.

Three occupants of the car were not injured, police said.

The death was the first traffic fatality of the year here and the 41st in Tarrant County.

Moore Funeral Home in Arlington will announce arrangements.

Surviving are his parents, Mrs. and Mrs. Jesse S. Williamson; four brothers, Jesse Williamson, Rocky Conaway, Ricky Conaway and David Conaway; a sister, Susan Williamson, all of Richland Hills; and his grandparents, Mrs. Mary Barner of Rusk and Mr. and Mrs. Rube Chapman of Farmersville.

Press Intelligence, Inc.
WASHINGTON, D.C. 20001

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MANKATO, MINN.
FREE PRESS

E - 28,500
JUL 28 1969

Accident victim

Cyclist dies after 2 years in coma

Michael David Allen, 20, Lake Crystal, became a 1967 Minnesota traffic statistic when he died at 1:35 p.m. Saturday at St. Joseph's Unit.

Two years and five days ago he collided with a car while on a motorcycle at the intersection of Highway 169 and Blue Earth County Road 69.

Allen went into a coma with multiple fractures and abrasions and never regained consciousness.

The accident happened Sunday, July 23, 1967. He was taken to Immanuel Unit. Late Sunday night he was transferred to St. Mary's Hospital, Rochester, and was still in critical condition on Wednesday after the accident. Allen was taken to St. Joseph's Unit in October 1967 and remained hospitalized.

The collision occurred at the intersection, when Ted Evenson, 61, of Garden City, was crossing Highway 169 heading into the Junction Inn. Evenson was not hurt.

The motorcycle was demolished and the car received $200 damage.

The Minnesota Highway Traffic Regulation Act, which prohibits any driver or rider of a motorcycle to operate it without a helmet on and fastened, was too late for Allen. Hair was found imbedded in the roof of the car according to the Highway Patrol. The law didn't go into effect until May 1, 1968. The law was passed in the 1967 legislative session.

Funeral services will be at 2 p.m. Tuesday at the Centenary Methodist Church, the Rev. Ralph High officating.

Burial will be in the Grandview Cemetery. Visitation will continue until noon Tuesday at Landkamers and one hour before services at the church.

Survivors include parents, Mr. and Mrs. Rollin Allen of rural Lake Crystal and grandmother, Mrs. Veva Sheppard of Gold Beach, Ore.

He was born in Mankato on Feb. 19, 1949 and was graduated by Mankato High School in 1967. Allen was active in track and gymnastics in school as well as stock racing.

At the time of the accident, he was employed at the Chip Steak Provision Co., Mankato.

Press Intelligence, Inc.
WASHINGTON, D.C. 20001

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DENVER, COLO.
ROCKY MOUNTAIN NEWS

M - 194,933
S - 209,571 ✓
APR 7 1969

Denver Youth Killed in Cycle Crash

A 15-year-old youth Sunday became Denver's 16th traffic fatality of the year when he died in Denver General Hospital of head injuries received in an auto-motorcycle crash Friday.

The youth was identified as **Michael Louis Abeyta**, son of Mr. and Mrs. Perfecto Abeyta of 2441 W. Amherst Ave. Denver had 23 fatalities for the same period in 1968.

Patrolman William D. Owens said Abeyta was a passenger on a motorcycle driven by his brother, Alvin G. Abeyta, 16, when the crash occurred at W. Seventh Ave. and Sheridan.

Owens said the motorcycle was northbound on Sheridan Blvd. when it hit a car driven by Mrs. Julie D. Tabberer, 36, of 623 Winona Court, as she attempted to turn left into a shopping center driveway.

Traffic Fatalities

Colorado, 1969	**127**
(Under 21)	**31**
Colorado, 1968	**119**
Denver, 1969	**16**
Denver, 1968	**23**

The Abeyta boys were thrown over the car for a distance of 43½ feet after the impact, Owens said. Albert Abeyta was taken to Denver General Hospital and released after treatment.

Officers said neither youth was wearing a crash helmet.

Press Intelligence, Inc.
WASHINGTON, D. C.

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3A

DENVER, COLO.
ROCKY MOUNTAIN NEWS

M - 192,279
S
MAY 27 1969

Deaths of 5 Persons Boost 1969 Highwaay Toll to 215

Traffic Fatalities	
Colorado, 1969	215
(Under 21)	58
Colorado, 1968	221
Denver, 1969	30
Denver, 1968	41

The annual death toll on Colorado highways continued to climb Monday as the State Patrol reported five persons killed, three of them in one crash.

Their death raised the 1969 traffic death count to 215, only six fewer than on this date last year.

Latest to die were **Robert Roy Peterson**, 19, of Anaconda, Mont.; **Murray Gosnell**, 23, who lived eight miles west of Dolores; **Grace Edith Muirheld**, 73, of Yuma; **Guy Frank Muirheld**, 51, of 240 E. 19th Ave., and **Ruth Evelyn Fender**, 68, who lived southeast of Akron.

* * *

State Patrolman Paymond Holt said Peterson died on the way to Lutheran Hospital of head injuries after his motorcycle crashed about two-and-a-half miles east of U.S. 40 on Lookout Mountain Road.

Holt said the motorcycle skidded 33 feet on the gravel shoulder before plunging into the borrow pit and throwing Peterson 17 feet.

Peterson was not wearing a crash helmet, Holt said.

State Patrolman Robert Espinoza said Gosnell was killed in a single-car crash five miles east of Pagosa Springs on U.S. 160.

His care went off the left side of the road and sslammed into a bridge abutment after Gosnell apparently fell asleep at the wheel, Espinoza added.

He said Gosnell, who died of head and internal injuries, was not wearing the seat belts installed in the car.

Mrs. Muirhead, her son, Guy, and Mrs. Fender were killed in a two-car crash three miles west of Otis on U.S. 34 in Washington County, according to State Patrolman John Edward Roth.

Toth sais the westbound car, driven by Mrs. Fender, apparently pulled into the east bound lane while attempting to pass another vehicle, and hit the eastbound car, driven by Mrs. Muirhead, head-on.

All three died of head and internal injuries.

Roth said neight vehicle had seat belts installed.

☐

Herman L. Blankenship Jr., 20, of 215 Chinquapin Drive, Alexandria, was killed last night when his motorcycle and a car collided at the intersection of Jordan-st and Raleigh-av. His head injuries could have been prevented if he had worn a helmet, Alexandria police said.

Washington Daily News 7/8/68

Press Intelligence, Inc.
WASHINGTON, D. C.

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NEWPORT, ...
NEWS ... LEADER

AUG 4 1969

E - 15,482

Ohio Girl Thrown Off Cycle, Killed

NEW BEDFORD, Pa. (AP)—A 19-year-old girl was killed today when she was thrown from the back of a motorcycle.

State police said Margaret Brindle, 19, of Boardman, Ohio, was a passenger on a motorcycle driven by Elbert Ledesque, 27, of Youngstown, Ohio, when it apparently went out of control along Pennsylvania 208 near New Bedford. Police said it went into a ditch and smashed against a telephone pole.

Miss Brindle hit her head on the pavement and was dead on arrival at a hospital. Ledesque was hospitalized in serious condition, police said.

Press Intelligence, Inc.
WASHINGTON, D.C.
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BELLINGHAM, WASH.
HERALD

E - 21,494
S - 22,543

APR 28 1970

Rider Injured In Cycle Wreck

Brenda L. Harrison, 17, 1714 Squalicum Lake Road, was in St. Joseph's Hospital Tuesday with cuts and bruises she received when she was thrown from her motorcycle.

The State Patrol said the 1968 'cycle went out of control Monday on the Squalcium Lake Road, a half mile west of Agate Bay. The 'cycle tipped over, throwing the girl on the pavement. She was not wearing a helmet at the time of the accident.

Miss Harrison was taken to the hospital by Crown Ambulance.

Identified as the drivers of vehicles involved in a collision in front of 2251 Mount Baker Highway are Raymond A. Sygitowicz, 19, Deming, and Herbert Arnold, 17, 2910 W. Maplewood Ave.

Press Intelligence, Inc.
WASHINGTON, D.C.
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CANTON, OHIO
REPOSITORY

E - 73,315
S - 83,181
APR 29 1969

Cyclist 23rd Fatality on Stark Roads

A skull fracture caused the death Sunday night of motorcyclist George Adam Phillips, 29, of 1123½ Market ave S, who was injured fatally on Route 30 in Perry Township.

The ruling was made Monday afternoon by County Coroner G. S. Shaheen, who scored the death the 23rd traffic fatality in Stark County this year.

Mr. Phillips suffered the fatal injuries when his cycle struck a concrete medial strip just south of Doctor's Hospital and flipped over.

The Ohio Highway Patrol said the victim was not wearing a protective helmet.

The crash was the second motorcycle fatality of the day in Stark County, occurring less than seven hours after Charles Isaac Byers, 32, of 4238 Waynesburg dr SE, was killed when his motorcycle crashed into a car on Route 43 at Sandy ave SE.

Services for Mr. Phillips will be held Wednesday at 10 a.m. in the Don Williams funeral home. Burial will be in Forest Hill Cemetery.

Friends may call today 2 to 4 and 7 to 9 p.m. at the funeral home.

Press Intelligence, Inc.
WASHINGTON, D.C.
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OKLAHOMA CITY, OKLA.
TIMES

E - 107,682   /

NOV 1969

Cyclist, 15, Killed

STATE TRAFFIC DEATHS
1969 to date: 722
1968 to date: 685
'69 deaths under 21: 228

A 15-year-old Mangum youth was killed Monday when his motor scooter and a car collided in Mangum, the highway patrol reported today.

Dead is Cary Clay Bock, son of Mr. and Mrs. Jack Bock of Mangum.

The youth died of head injuries after the collision with a car driven by Nelson Myrle Cooksey, 26, Mangum, who was not injured. The highway patrol said Bock was knocked off the scooter at impact and that he was not wearing a helmet.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

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PHILADELPHIA, PA.
BULLETIN

E - 640,783
S - 681,831

OCT 18 1970

Helmet Unused, Boy Cyclist Is Killed on His 'First Ride'

By J. HARRY CAMP
Of The Bulletin Staff

Friday may have been the first time James Gerard Solon, 17, ever rode a motorcycle.

It was also he last time.

The Roxborough High School honor student was killed when he lost control of the borrowed machine on a hill and was thrown into a metal fence.

His parents, Mr. and Mrs. John J. Solon, of 3457 Cresson st., East Falls, said as far as they know their son never before rode a motorcycle.

"He never said anything about operating or wanting to own one," said his mother, Ann Marie.

"When we got to the hospital and the ytold us about the accident, I was sure it wasn't our son," she said, "because he never showed any interest in motorcycles."

Borrowed Cycle

But it was their son. And yesterday, in the Solon home, with Jimmie'sdog waiting at the door for his master to come in, Mrs. Solon described whats he believed happened.

"It was a borrowed motorcycle," she said. "We understand somebody dared Jimmie to get on it.

"Oh, he was a daredevil. He was never afraid. He must have gotten on it and driven off even though he had never been on one before."

Police said the motorcycle belonged to a 22-year-old youth who loaned it to a Roxborough High School student to take to the school at Ridge ave. and Fountain st.

Loses Control

This student apparently loaned it to Jimmie, who drove it a block and a half east where he lost control as he turned to go up Fairway terrace. Jimmie was thrown headfirst into a wrought iron fence in front of an entranceway.

The unused helmet was still strapped to the side of the motorcycle when police took it away after the accident.

The accident was at 12.30 P. M. Jimmie, along with all the other Roxborough High School students, had been dismissed earlier in the morning because of the teacher strike.

But Jimmie would not have been at school in the afternoon even if there had been no strike.

He was enrolled in a special program for students with especially high grades that enables them to attend classes in the morning and hold jobs in the afternoon. His lowest mark last year was 83. All his other grades were in the 90's.

Gas Station Job

At 12.30 P. M., he normally would have reported for work at a service station on Levering Mill road in Belmont Hills. But on Friday, because of construction work at the station, Jimmie's boss had told him not to come to work until 3 P. M.

"Jimmie wanted to go to college," said his mother. "He was a whiz at mathematics and he wanted to be an accountant.

"He liked to play baseball and he was a good mechanic. But motorcycles . . . oh, no. He never even talked about them."

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

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SARASOTA, FLA.
HERALD TRIBUNE ✓

M - 30,000
S - 35,066
JUN 10 1969

16-Year-Old Sarasota Youth Killed In Motorcycle Crash

A 16-year-old Sarasota boy was fatally injured Monday afternoon when his motorcycle slammed into the side of a car on Fruitville Road three miles east of Sarasota, and catapulted him beneath an oncoming vehicle.

Charles Reed Cotilla, 4858 Proctor Road, who state troopers say was not wearing a crash helmet, was pronounced dead at 6:22 p.m. in the emergency room at Sarasota Memorial Hospital.

Florida State Trooper C. E. Campbell said Cotilla's motorcycle was westbound on Fruitville Road when an eastbound car driven by Joann Marie Dudash, 27, 2574 Hawthorne St., Sarasota, made a left turn into his path.

Campbell said Cotilla was thrown from his vehicle on impact. The youth slid down the pavement, he said, and stopped under the front of an eastbound car driven by James Harold Black, 40, 134 Conrad Ave., Sarasota. Black had just halted his vehicle. He had been immediately behind the Dudash car.

Campbell charged Joann Dudash with failure to yield right of way while turning left.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

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ANCHORAGE, ALAS.
TIMES

E - 31,354

NOV 2 1970

Man Dies When Hit On Cycle

An Anchorage man was killed about 2:30 a.m. Sunday when the motorcycle he was riding was struck from the rear as he was stopped for a red light.

Ronald Peter LaFramboise, 18, of 2603 29th Ave., received massive internal injuries, a brain concussion and hemmoraging of the brain in the accident. He died a few hours after the accident in Providence Hospital.

City police meanwhile arrested Larry Allen Austermual, 29, of Kasilof. He was charged with driving while intoxicated and with failure to remain and render assistance, a felony.

Police Sgt. Ron Otte said LaFramboise was stopped for a red light at Spenard Road headed west on Northern Lights Boulevard when the incident occurred. The Austermual vehicle continued through the intersection after the impact.

Otte said witnesses followed the vehicle to the Minnesota Bypass, where it turned right. Austermual was apprehended at 26th Avenue and the bypass, Otte said.

The injured man was taken to Providence Hospital for treatment. He died a few hours later, Otte said. There was no indication that the motorcycle rider was wearing a safety helmet.

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WASHINGTON, D. C. 20001

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BINGHAMTON, N.Y.
SUN-BULLETIN

M - 28,638

SEP 21 1970

Car-cycle crash claims 2d life

A 16-year-old Town of Union youth died early this morning at Wilson Memorial Hospital from injuries suffered in a car-motorcycle crash Saturday night that also took the life of his 17-year-old companion.

Dennis Matthews of 762 Town Line Road, Town of Union, a passenger on the motorcycle, died shortly before 1 a.m. this morning, hospital officials said. The youth had been in critical condition with a head injury since he was admitted shortly after 7:30 p.m. Saturday.

Steven Supa, of 201 Albany Avenue, Johnson City, the driver of the motorcycle, was killed instantly in the crash when he was thrown into the windshield of the car with which the motorcycle collided. Dr. Melvin D. Jones, a Broome County coroner, pronounced the youth dead at the scene.

Michael Sturdevant, 17, of 329 Reynolds Road, Johnson City, the driver of the car, and Raymond Ritch, 18, of 9 Lindbergh St., Johnson City, his passenger, escaped serious injury in the accident.

Deputies were still trying to piece together the circumstances of the crash last night.

They believe that the Sturdevant car, traveling south on Oakdale Road, was passing another vehicle when the impact occurred. Young Sturdevant apparently could not see the motorcycle approaching in the early evening darkness, deputies said, because there were no lights on the motorcycle. The crash took place in the northbound lane in front of 1142 Oakdale Road, deputies said.

Both youths were thrown from the motorcycle, deputies said, and neither was wearing a protective helmet. The fatalities were the 30th and 31st recorded in Broome County this year.

Press Intelligence, Inc.
WASHINGTON, D. C.
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ALTON, ILL.
TELEGRAPH

E - 38,240

AUG. [illegible] 1969

Cycle-Car Crash Fatal to Youth, 17

A 17-year-old Alton youth was fatally injured Thursday when his motorcycle slid into the side of a car turning off the Beltline onto Alby Street.

Bruce Edward Gray, 17, son of Mr. and Mrs. Olin Gray of 856 Chouteau Ave., Alton, died at 8 p.m. Thursday at Barnes Hospital in St. Louis where he had been taken after emergency treatment at Alton Memorial Hospital.

Police said the youth had a cast on one arm apparently from a previous motorcycle accident.

Alton Police Patrolman Jesse Cunningham said that Gray was not wearing a safety helmet when he was fatally injured. He suffered massive head injuries along with fractures of the arms and legs.

The Illinois Supreme Court recently ruled as unconstitutional a section of the law requiring that motorcycle riders wear safety helmets.

Gray's death brings the number of fatal accidents

(Continued on Page 2, Col. 2.)

Young Cyclist Ignores Helmet, Loses His Life

[illegible] of Jimmy Anson [illegible] Donohue, [illegible] of Stevinson was strapped to the handlebars of the youth's motorcycle when he was fatally injured last night.

With a compound fracture of the forehead, his brain exposed, the youth lived only an hour in Turlock Community Hospital after his motorcycle collided with a car.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001
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OXNARD, CAL.
PRESS COURIER

E - 2[illegible],801
S - 21,[illegible]43

DEC 23 1969

Motorcyclist Dies After Hitting Pole

A 15-year-old Thousand Oaks boy was killed Monday night when he was hurled head-long into a telephone pole after losing control of a motorcycle he was riding near his home, sheriff's deputies said.

Gary C. Weber, son of Mr. and Mrs. Ronald Weber, 1460 Avenida Los Arboles, died at 6:45 p.m. at Los Robles Hospital without regaining consciousness. He had suffered severe head injuries.

Deputies said Weber was traveling north on Calle Tulipan when the accident occurred about 4:56 p.m. near Avenida Los Arboles. Two friends witnessed the crash.

The motorcycle, according to deputies, veered off the roadway, leaped over a curb, slammed into a mailbox and fire hydrant, and then threw Weber into the large wooden pole. He was not wearing a protective helmet at the time.

Gary Nixon, 16, of 1489 Calle Madreselea, said Weber had borrowed his motorcycle. He said he and William Smith, 15, of 1490 Calle Abeto, were behind Weber.

He said Weber turned around to "look at us," when the motorcycle suddenly careened out of control.

Funeral services for Weber are pending at the Griffin Brothers Mortuary in Thousand Oaks.

Press Intelligence, Inc.
WASHINGTON, D. C.

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SAN MATEO, CAL.
TIMES & NEWS LEADER

E - 44,360

JUL 12 1969

R.C. Boy Killed On Cycle

Douglas Ralph Shoop, the 18-year-old son of Mr. and Mrs. Ralph F. Shoop of 180 Cerrito Avenue, Redwood City, was apparently instantly killed when he struck a large oak tree head-on after losing control of his 1967 model English motorcycle on the winding Westridge Drive in Portola Valley last night, sheriff's deputies reported today.

He had no crash helmet.

Deputies Dennis Bentley and Eugene Boklund reported the youth, a student at Woodside High School, was westbound on the road, apparently at high speed, when he lost control on a sharp curve east of Paloma Road. The motorcycle left the roadway, travelled through some light brush and struck the oak tree, whose trunk had a 4-foot diameter, head-on.

The deputies said they found the trunk of the tree badly scarred about 2-feet up from the base, and an indentation with some hair in it.

When they arrived at the scene, Bentley and Boklund reported, Shoop was lying on his side and bleeding from both ears, the mouth and nose. They said he had no pulse and was not breathing. He was pronounced dead on arrival at the Stanford Medical Center.

A friend, David L. Condon of 9 Betty Court, Atherton, told the deputies he and Shoop had almost reached their destination. He said he was going about 35 to 40 miles per hour, but Shoop was gaining on him.

Condon said he reached a driveway, and "All I knew he wasn't there. The others said they heard some skidding, and I went back and found him off the road."

Rank: Sgt
Age: 35
Type vehicle: Honda 90cc motorcycle

Description of accident:
As he was cruising along on his lightweight motorcycle at a low rate of speed near one of our overseas bases, the Sgt saw a small pig crossing the road. He attempted to avoid it and almost did. But the pig had other notions. It darted back the way it had come and ran into the motorcycle, knocking the Sgt off. **The Sgt struck his head on the pavement and sustained a skull fracture.** ***He was not wearing a helmet.*** He never regained consciousness.

Probable cause:
Unsuccessful evasive action.

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MODESTO, CAL.
BEE

E - 45,178
S - 47,770

NOV 10 1970

Accident Kills Sonora Youth On Motorcycle

McClatchy Newspapers Service

SONORA — Michael Dean Grogan, ~~16, of~~ Sonora died In Scenic General Hospital early this morning of massive head injuries suffered eight hours after a motorcycle on which he was riding crashed into the rear of a car on Highway 108 three miles east of here.

The driver of the car, Mrs. Carol Ennis, 37, of Sonora told California Highway Patrol officers she heard a thump and saw a boy sailing past the window; he was attempting to keep upright. She said he looked as though he was skating by.

Richard Engel, 17, of Sonora, the driver of the motorcycle, was not injured.

Stopped Car

Mrs. Ennis had stopped her car on the highway, waiting for traffic to clear so that she could turn left into the parking lot of Value Giant store.

Highway Patrol officer Richard Carter, who witnessed the accident, estimated the motorcycle's speed at 55 to 60 miles per hour. He reported the driver had his head turned to the right and was squinting, maybe because of the sun.

Grogan, who was not wearing a crash helmet, landed on his back in the middle of the highway. The Highway Patrol report said the driver applied the brakes but the cycle skidded on the wet pavement into the rear of the car.

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

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OGDEN, UTAH
STANDARD-EXAMINER

E - 41,208
S - 41,661
SEP 9 1970

Motorcycle Crash Kills Ogden Teen

A 17-year-old Ogden boy was fatally injured Tuesday at about 5:45 p.m. when his motorcycle collided with a car on Harrison Boulevard at Old Post Road.

Victor Kim Collett, son of Mrs. Aletha Dustin of 3135 Iowa died nearly three hours after the accident in the McKay Hospital. He suffered massive head injuries in the mishap.

Utah Highway Patrol Trooper Rob Nielsen said the Collett youth was turning left off Old Post Road onto Harrison when he was struck by a northbound car driven by James George Michelson, 33, of 1832 E. 1950 S.

FRONT OF CAR

Trooper Nielsen said the motorcycle collided with the right front of the vehicle. He said the Collett youth was not wearing a helmet at the time of the accident.

Officials at the McKay Hospital said the youth died of massive head injuries at 8:33 p.m.

Two other persons were injured in accidents in Ogden Tuesday, one when his motorcycle struck a dog and the other when struck by a car after getting off a bus.

Edwin Jardine, 15, son of Mr. and Mrs. Jim J. Jardine of 3975 Adams of South Ogden, suffered leg and arm injuries when struck by the car at 36th and Monroe at about 6 p.m. He was treated at the McKay Hospital and released.

STRUCK BY CAR

Officer Willard Cragun said the youth was struck by a car driven by Jamie Cave, 16, of 2640 Liberty, westbound on 36th.

Miss Cave told the officer she saw the city bus stopped at the north curb. As she got to the front of the bus the boy ran out into the path of the car.

Officer Cragun said the youth was carried on the hood of the car for about 62 feet before falling off. No citations were issued.

Thayer Forrest Hussey, 22, of 878 24th suffered bruises and scrapes on his right leg when he struck a dog with his motorcycle near Fowler on 29th Street at 8:06 p.m. Tuesday.

SEE DOCTOR

Officer Jerry Smith said Mr. Hussey did not require hospital treatment, but said he would see his own doctor for treatment of his injuries.

(See obituary on Collett youth on Page 3D.)

Press Intelligence, Inc.
WASHINGTON, D. C. 20001

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BRIDGEPORT, CONN.
TELEGRAM

M - 12,425
SEP 15 1970

Motorcyclist, 19, Hurt Critically in Fairfield Crash

A 19-year-old Fairfield university student was crtically injured yesterday at 12:08 p.m. when the motorcycle he was riding collided with a car on North Benson road in Fairfield, police reported.

Being treated in the intensive care unit at Park City hospital for a fractured skull and broken left wrist is Trevor Tellis, of 834 Holland Hill road, Fairfield.

Patrolman Robert J. Dunn said the motorcycle was heading south on North Benson road when it struck the left front fender of a car that was crossing North Benson road from Walls drive to the Connecticut turnpike entrance ramp.

The driver of the car, Anna Buddenhagen, 70, of 288 Hunyadi avenue, Fairfield, was charged by police with failure to grant right of way to a vehicle not obliged to stop and operating a vehicle with unsafe tires.

Patrolman Dunn said the Tellis youth was hurled 20 feet from the impact of the crash. The cyclist's protective helmet was strapped to the motorcycle handlebars at the time of the accident, he added.

SAGINAW, MICH.
NEWS

E - 59,374
S - 59,366

1969

Cycle Victim Identified

A 14-year-old girl killed in a motorcycle accident at 18th and Washington early Friday morning was identified today by her sister.

Mrs. Ophelia Worley of Three Rivers this morning identified Diane McCarthy who was declared dead on arrival at St. Mary's Hospital shortly after the accident at 3:45 a.m. Friday. Miss McCarthy had been living with her sister until six weeks ago when she had run away and was reported missing.

Police are holding the driver of the motorcycle, a 26-year-old Burt Township man, for investigation of negligent homicide. Police said today that they have conflicting stories from witnesses. They said it appeared Miss McCarthy was killed when her head struck a curb as the motorcycle tipped over.

Man killed, boy hurt in crashes

A 27-year-old Sunnyvale man was killed and an 8-year-old Santa Clara boy was seriously injured in two separate motorcycle accidents in Palo Alto over the weekend, police reported today.

Killed was Michael Stephen Isaac, of 1127 Prunell Court, Sunnyvale, a student at the University of Texas, Austin. He was headed westerly on University Avenue at El Camino Real at 1:48 a.m. Sunday, when, witnesses told police, his cycle drifted to the left, struck a center planter strip and flipped.

Isaac hit his head first on a concrete curb 32 feet west of the point of impact, then on another curb several feet further.

A nurse at the Palo Alto Medical Clinic, who witnessed the accident revived Issac with mouth to mouth resuscitation and a medical student at Stanford University continued the breathing resuscitation but Isaac died about two hours later at Stanford Hospital.

Police reported there was a "strong odor of alcohol" about him and that blood analysis tests are being made. He was not wearing a crash helmet, just a knit pullover cap.

[illegible]

AD. DATE

E - [illegible]

Cycle Crash Takes Life Of Stamford Man

A Stamford man died of multiple skull fractures early Sunday after his motorcycle went out of control on Long Ridge Rd. Saturday and crashed. His six - year - old son, who was wearing a crash helmet, sustained a bump on his head and abrasions.

Police said Thomas J. Stuart, 26, of 112 Lawn Ave., was riding his motorcycle south on Long Ridge Rd. about [illegible] p.m. [illegible] behind him, when the motorcycle went out of control on a curve near Parsonage Rd., veered right onto the shoulder and overturned.

Stuart died early Sunday morning at Stamford Hospital from his injuries. Brian was treated for abrasions on his face and knees and x-rayed, then released.

Press Intelligence, Inc.
WASHINGTON, D.C. 20001

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CHEYENNE, WYO.
TRIBUNE APR 16 1970
E - 10,487
TRIBUNE-EAGLE
S - CIRC. N-A

Cyclist, 17, Injured in Collision

A 17-year-old Cheyenne youth was severely injured yesterday when his motorcycle struck the rear of a truck on Warren between Third and Fourth Avenues, police said.

They said Randy D. Hodson, of 6123 Kerry Ave., was taken to Memorial Hospital by the Cheyenne Ambulance Service. Hospital officials said the youth suffered a skull fracture and that he was in fair condition today.

Police said the truck driven by Akes was going north at slow speed on Warren when it was struck in the rear by the Hodson cycle.

They said both drivers were issued carless driving citations, a routine action in such investigations.

Hodson did not wear a protective helmet, police said.

Press Intelligence, Inc.
WASHINGTON, D.C. 20001

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TWIN FALLS, IDAHO
TIMES NEWS

D - 20,841
S - 21,330
AUG 3 1969

Richfield Youth Is Cycle Crash Victim

RICHFIELD — A 16-year-old Richfield youth died about 10 a.m. Saturday at St. Benedict's Hospital, Jerome, of injuries received Friday night when the motorcycle he was riding collided with a car two miles west of Richfield.

The victim is Fred Powell, son of Mr. and Mrs. James Powell. He was rushed to the hospital where he underwent surgery for a broken arm, broken leg and shoulder and head injuries.

Deputy Sheriff Martin Whitesell, investigating officer, said the motorcycle collided with a car driven by Bev Flora, 47, Richfield rancher, about 6:30 p.m. Friday in front of the Powell home.

The youth hit the windshield of the Flora car, then landed on the rear bumper, it was reported. The deputy said the boy was not wearing a helmet at the time of the accident.

Dr. Carlyle Small, the victim's attending physician at the hospital, said Saturday night he had not listed the cause of death.

Officers said the boy was a diabetic and because of the accident and lack of an immediate supply of insulin, may have gone into shock. However, Dr. Small would not confirm that the boy was diabetic or that he went into shock.

Funeral services will be conducted at 2 p.m. Tuesday at the Richfield High School auditorium by Rev. Don Mason of Salt Lake City, Utah. Concluding rites will follow in the Richfield Cemetery.

Services are under the direction of the Bergin Funeral Chapel of Shoshone.

Motorcycle Wreck Fatal For Man, 26

A 26-year-old Hyattsville man died yesterday of head injuries suffered in a motorcycle accident Wednesday, police said.

Robert Hollingsworth Jr., of 6504 Red Top Rd., Hyattsville, was pronounced dead at Washington Hospital Center.

Hollingsworth was driving a 1947 motorcycle on Columbia Road NW, near Ontario Road NW, at about 7 p.m. Wednesday, when he lost control and was thrown against a parked car, police said. He was not wearing a helmet at the time of the accident, according to police.

Post 7/18/70

Press Intelligence, Inc.
[illegible]

Front Edit/ Other
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NEWPORT BEACH, CAL.
PILOT

E - 37,128

JUL 24 1970

RECEIVED
APR 21 1971
HIGHWAY SAFETY GROUP

DAILY PILOT EDITORIAL PAGE

Motorcycle Tragedy

The photograph which passed across the news desk was typical: A battered bike lying on its side . . . a policeman with a clipboard making notes . . . a crumpled gray ambulance-type blanket.

"They ought to outlaw motorcycles," said one editor, looking at the grim tableau.

"No," said another, who likes to ride. "What they ought to do is make helmets absolutely mandatory."

A Costa Mesa youth had been riding his motorcycle to Newport Beach Thursday for a summer school marine biology laboratory class.

He was 18 and he probably had a lot of plans for a life that was over at 6:25 a.m. in the emergency room at Costa Mesa Memorial Hospital.

He had worn no protective helmet.

He may not have read about two other helmetless motorcyclists killed the same way in Costa Mesa in the past 60 days, and the danger involved.

He was only 18 when he became the third one Thursday.

In almost every motorcycle fatality in recent times along the Orange Coast, head injuries were determined to be the cause of death. Officers investigating these crashes have, in many instances, felt that had the rider been wearing a helmet, the rider's chances for survival would have been significantly increased.

Some states have imposed those rigid laws requiring motorcyclists to wear safety helmets — with a heavy fine the penalty — just as motorists must drive with headlights at night.

A survey in Washington state showed a 73 percent reduction in motorcycle accident fatalities following enactment of the helmet law. People are alive and riding today because of it.

A campaign has been underway in California for the same type of regulation, on the part of cycle clubs, lawmen and medical research groups.

Harbor area law enforcement officials, noting that motorcycle and motorbike are an increasing part of life in our area of beaches and colleges, are convinced that much more urgency must be given to both safety education and safety legislation for the two-wheelers.

Columbian

Death ends long ordeal for mother

FULLERTON (UPI) —Glenn Hunt's mother buries him today. Stella Hunt had nursed him, washed him, fed him and exercised his flaccid muscles since the day in June, 1956 when Hunt's motorcycle collided with a truck.

For 13 years, 8 months and 4 days, Hunt, who was 29 when the accident occured, remained in a coma. His physician, Dr. James C. Low, said the length of his coma was not as unusual as the devotion displayed by his mother. "To keep anybody going for this length of time in this kind of state is really something," he said. "I don't recall her even once showing discouragement, and she knew there was no hope."

"Glenn was a wonderful son. I felt I wanted to do this," Mrs. Hunt said.

Feb. 25 1970

AMERICAN MOTORCYCLIST ASSOCIATION

P.O. Box 141, Westerville, Ohio 43081
Telephone (614) 891-[illegible]
Telex: 24[illegible]92

FACTORS TO BE CONSIDERED IN CONNECTION WITH LEGISLATION REPEALING MANDATORY MOTORCYCLE HELMET LAWS

The issue presented to legislators by a bill to repeal the mandatory helmet law for motorcyclists is whether or not motorcyclists should be required by the state legislature to wear helmets as opposed to voluntarily wearing them. In order to decide this question, state legislators will have to make two basic determinations: first, whether or not their constituents are really opposed to mandatory helmet laws, and second, whether there exist any factors that would justify overlooking such an overwhelming opposition on the rationalization of improved safety afforded the motorcyclist by laws requiring use of a helmet.

Opponents to mandatory helmet laws argue that such laws are an infringement of personal liberty. This argument has been countered by the contention that injured motorcyclists may become public burdens. Of course, similar analogies can be drawn, such as the potential public burden imposed by smokers becoming cancer victims. This "public burden" argument, when carried to its logical extent, becomes ludicrous.

Helmet law opponents also base their opposition on the following main arguments, which actually apply to helmet usage, per se;

1) Helmets reduce visual and auditory capability.
2) Wearing a helmet causes an increase in the likelihood of neck injury.
3) The use of helmets may cause death, injury, or accident to be more likely through causing fatigue, inattention, or engendering a false sense of security.

While a thorough examination of these arguments pro and con is beyond the scope of this paper it can be said that federal government studies have indicated that helmets do not significantly decrease hearing or visibility, and that further study and research is needed to assess the other contentions pointed out. We will confine our comments to that latter issue of mandatory helmet laws.

Proponents of motorcycle helmet laws seem to feel that motorcyclists cannot be properly educated in the business of effective safety procedures and therefore must be forced to take care of themselves. The main argument given as to the need for helmet laws is that a motorcycle helmet protects the head of a motorcyclist, and reduces tramatic injury in the event of an accident. Common sense indicates that wearing a helmet reduces the chance of being injured in the event of an accident more than not wearing a helmet. However, only two recent studies have been carried out to attempt to answer this question in an unequivocal manner. Unfortunately, each study is fraught with deficiencies that make them untenable. In the first, the United State Department of Transportation's Michigan-Illinois study, by Henri Richardson (1974), the issue is so narrowly delineated as to predetermine the results, which support helmet laws.

The paper contends to examine two states, one state (Michigan) with a helmet law in effect, and the other state (Illinois) without such a law. However, certain inadequacies lend discredit to the results, which from the beginning were designed to deal with "the extent of reduced head injury in motorcycle accidents as a direct result of mandatory helmet usage," a statement from the introduction to the study, and typical of built in biases found in it. Specifically, these inadequacies revolve around the general incomparability of one state's data to the other. While data was gathered in Michigan discontinuously, with information on 25% of all motorcycle accidents, in both urban and rural settings, the data from Illinois was gathered more continuously, on higher speed, rural traffic-way accidents, in a state that still has no statewide reporting system. Furthermore, accident information for both states was accumulated by use of an extra report form to be completed by the investigating authority, which may or may not have been familiar with motorcycle size, brands, and/or extent of rider injury necessary to complete the form. In any such case, investigators should be instructed in the use of such forms, to maximize reliability.

Lloyd G. Turner, former Chief of the Office of Traffic Safety, State of California, has made the statement: "If one assumes the Michigan/ Illinois Motorcycle Safety Study is valid and that it covers all aspects of the problem, then it would appear that states with compulsory motorcycle safety helmet laws should have from 40% to 60% lower motorcycle fatality rates. The actual figures prove this is not the case. Therefore, California must do something that is just as effective as mandatory motorcycle helmets. California needs proof positive that helmet legislation will further reduce the fatalities."

A second study, by Dr. Leon Robertson, of the Insurance Institute for Highway Safety (1975) employed an impressive experimental design and data analysis. Unfortunately, the efficacy of his results is diminished by his use of an improper data base, notably, the ratio of the number of fatalities registered by selected states per unit number of motorcycle registrations (herein f/r). The issue of determining the importance of the helmet as a safety device, however, must be directed to a data base that addresses the question at hand, namely the ratio of fatalities per unit number of accidents, (herein f/a).

The statistic often used, the number of fatalities to unit registrations, may assess the general safety of the machine, but the f/a statistic assesses the effect of helmets once an accident has occurred. This is true even in the event of the inconsistent accident reporting techniques used by various law and hospital agencies.

In both cases, the studies were undertaken with the expressed and admittedly biased purpose of demonstrating that helmets reduce serious injury once an accident has occurred which, in addition is more apropos to the effects of helmet use per se, as opposed to laws requiring helmet use. A scientist that is pretheoretically and conceptually biased will always be able to find data and methods to suit his purpose. Furthermore, because of improper methodologies, we are left with results of two studies that, while demonstrating their pretheoretical intent are essentially meaningless. This is especially true when attempting to use these studies to analyze the effectiveness of laws that require motorcyclists to wear helmets.

The American Motorcyclist Association has been collecting nationwide motorcycle accident, fatality and registration figures since 1963, and our compilation is the most complete and correct in the country to date. The meaningful statistic, as mentioned above, to assess the effectiveness of motorcycle helmet laws is the ratio of the number of motorcyclists fatally injured to the total number of motorcycle accidents. This is true because no one has contended that laws requiring motorcyclists to wear helmets will reduce the number of accidents, but only protect from injury once involved in an accident. Thus, by comparing the fatality accident "(f/a") ratio for years before and after the enactment of mandatory helmet laws their effectiveness can be assessed.

The AMA has carefully reviewed the situation, and has compiled a list of the 18 states that offer reasonably clear and consistent statistics, specifically, the number of fatally injured motorcyclists. In our survey, we have averaged the fatality per 100 accident ratio ("f/100a") over all years before and after law enactment; if the law was enacted other than on the first of January, we did not use that years's data. For example, if an enactment occurred on the 26th of July (Indiana) the before years consisted of 1963-1966, and the after years were 1968-1975. Thus, for Indiana, the average f/a ratio before years was 2.301 and the average after ratio was 2.230. No data was used from a state that referred to "fatal accidents" due to the fact that this figure often includes non-motorcyclists such as pedestrians, auto drivers, etc. (There are at least 19 confirmed "fatal accident" reporting states). No data was utilized from states that did not have complete year to year statistics, or that had changed any recording procedures (from rural accidents only to urban and rural, for example), or that rounded off or estimated figures, or from states that had not had a helmet law in effect for at least three years.

The following table sets forth the comparison made.

State	Average f/100a ratio for all years before law	Average f/100a ratio for years after law
Arizona	1.680	2.095
Georgia	5.111	3.361
Hawaii	2.148	1.313
Idaho	3.107	2.603
Indiana	2.301	2.230
Kansas (see note 3	2.231	2.357
Maine	4.831	1.943
Maryland	2.538	1.968
Nebraska	1.697	1.939
New Hampshire	4.038	3.383
New Jersey	2.309	2.115
New Mexico	2.316	2.492
North Dakota	1.947	2.887
Oklahoma	2.159	3.229
Oregon	2.097	3.032
Pennsylvania	3.227	3.603
South Dakota	1.837	3.100
Washington	1.791	2.160
	Overall Average = 2.688	Overall Average = 2.562

The average f/100a ratio for all 18 states for all years before helmet laws is 2.688 while the average f/100a ratio for all states after enactment of helmet laws is 2.562. A common statistical test shows that there is no significant difference between the before law numerical average and the after law average. If helmet legislation did significantly decrease fatalities, the before f/a ratio would have had to exceed 3.875 or the after f/a ratio would have had to be smaller than 1.375. Thus, the smaller difference is not large enough to exceed what might be normally expected to occur by chance alone.

To summarize, we have examined whether mandatory helmet legislation is effective in reducing the number of fatalities after such legislation has been enacted. The 18 states that offer comparable statistics (that is, "fatally injured motorcyclists", as opposed to "the number of fatal accidents") show no significant decline from the before ratio in fatalities per unit accident. Given the data, the necessary interpretation is that laws making motorcyclists wear helmets are not effective in reducing fatalities. As pointed out earlier, this should not be construed to say that the voluntary use of motorcycle helmets is not effective or advisable. In fact, the American Motorcyclist Association has always encouraged the voluntary use of helmets by its members and will continue to do so. However, in place of mandatory helmet laws, the American Motorcyclist Association believes in the inherent intelligence of motorcyclists and will continue to urge the voluntary use of helmets that are of good quality and meet the necessary required standards for quality and construction.

GRAPHIC STUDY
of
MOTORCYCLE ACCIDENT
STATISTICS
in PENNA.

/ 76

REPARED BY:Rich Halverson of M.A.U.L. 70

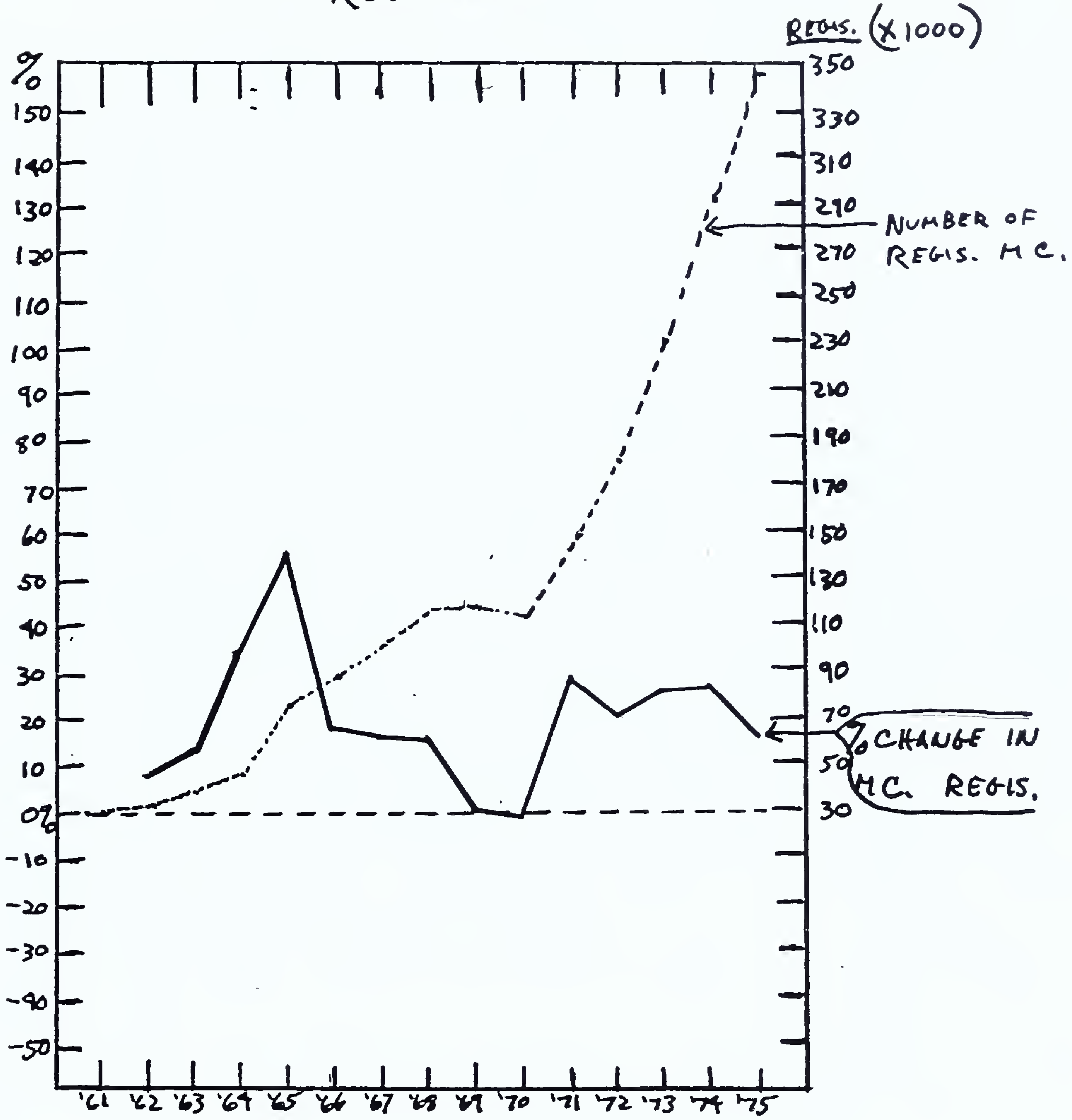
FOR:

ASED ON:Penna. Dept. of Trans. Statistics

INDEX

① REGISTRATION
(2A) INJURY ACCIDENTS RATE
(2B) TOTAL INJURIES RATE
(3A) FATAL ACCIDENTS RATE
(3B) FATALITY RATE
(4A) ACCIDENT RATE
(4B) INJURY ACCIDENT RATE
(4C) FATAL ACCIDENTS RATE
⑤ DEATH RATE
⑥ FATALITIES
⑦ U.S.: REGISTRATION, DEATH + DEATH RATES

GRAPHIC STUDY of : REGISTRATION



COMMENTS:

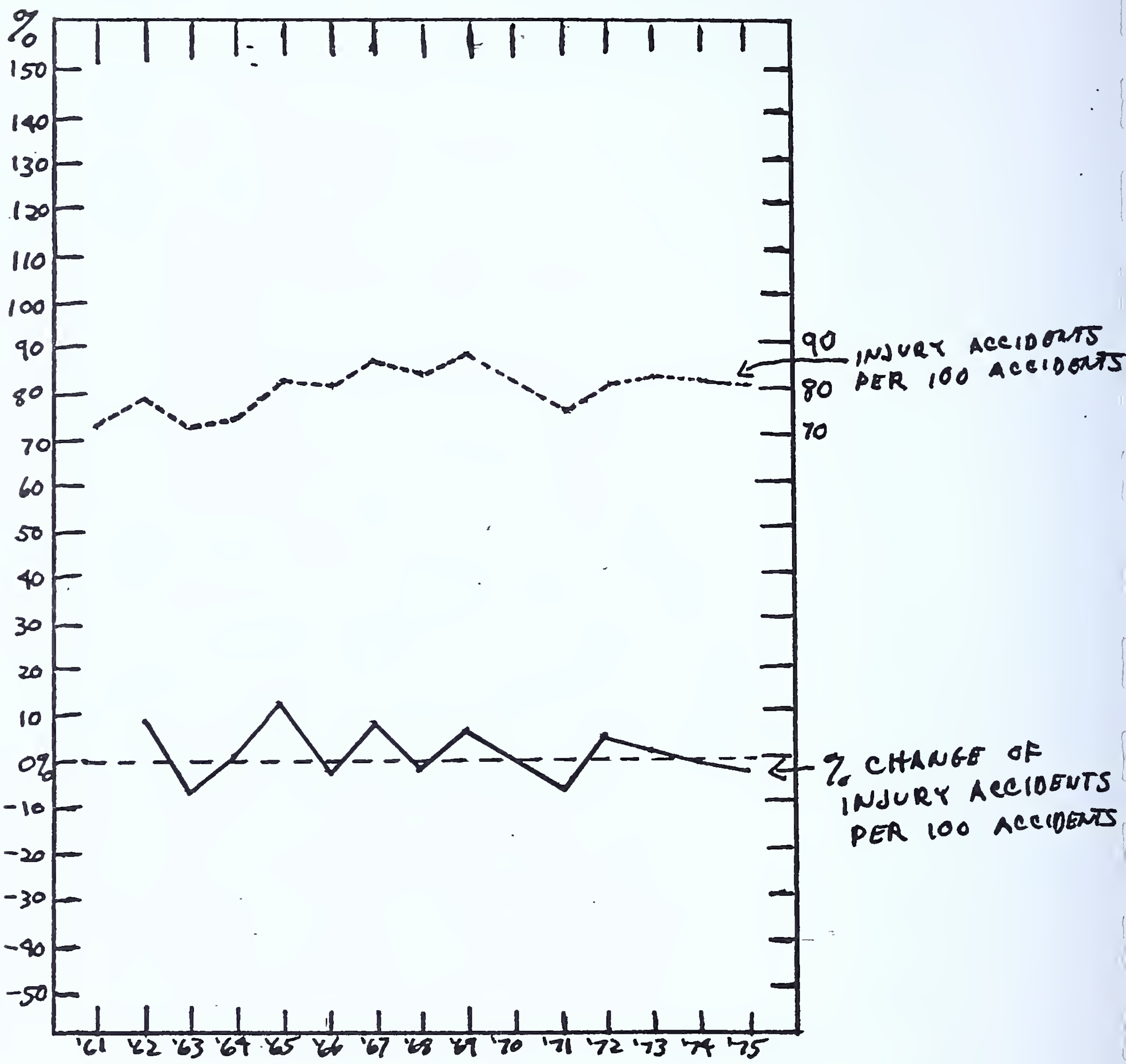
MOTORCYCLE REGISTRATION RATE PEAKED AT AN ALL TIME HIGH IN MID '60'S, THEN WAS LOWERING WHEN GOV'T ENFORCED SAFETY REGULATIONS CAME ABOUT. IT SINCE HAVE RISEN A BIT AND LEVELED OFF.

PREPARED BY: Rich Halverson, M.A.U.L. of PA.

BASED ON: Penna. Motorcycle Statistics from Pa. Dept. of Trans.

①

GRAPHIC STUDY of : INJURY ACCIDENTS RATE PER 100 ACCIDENTS



COMMENTS:

(1970 FIGURES NOT AVAILABLE)

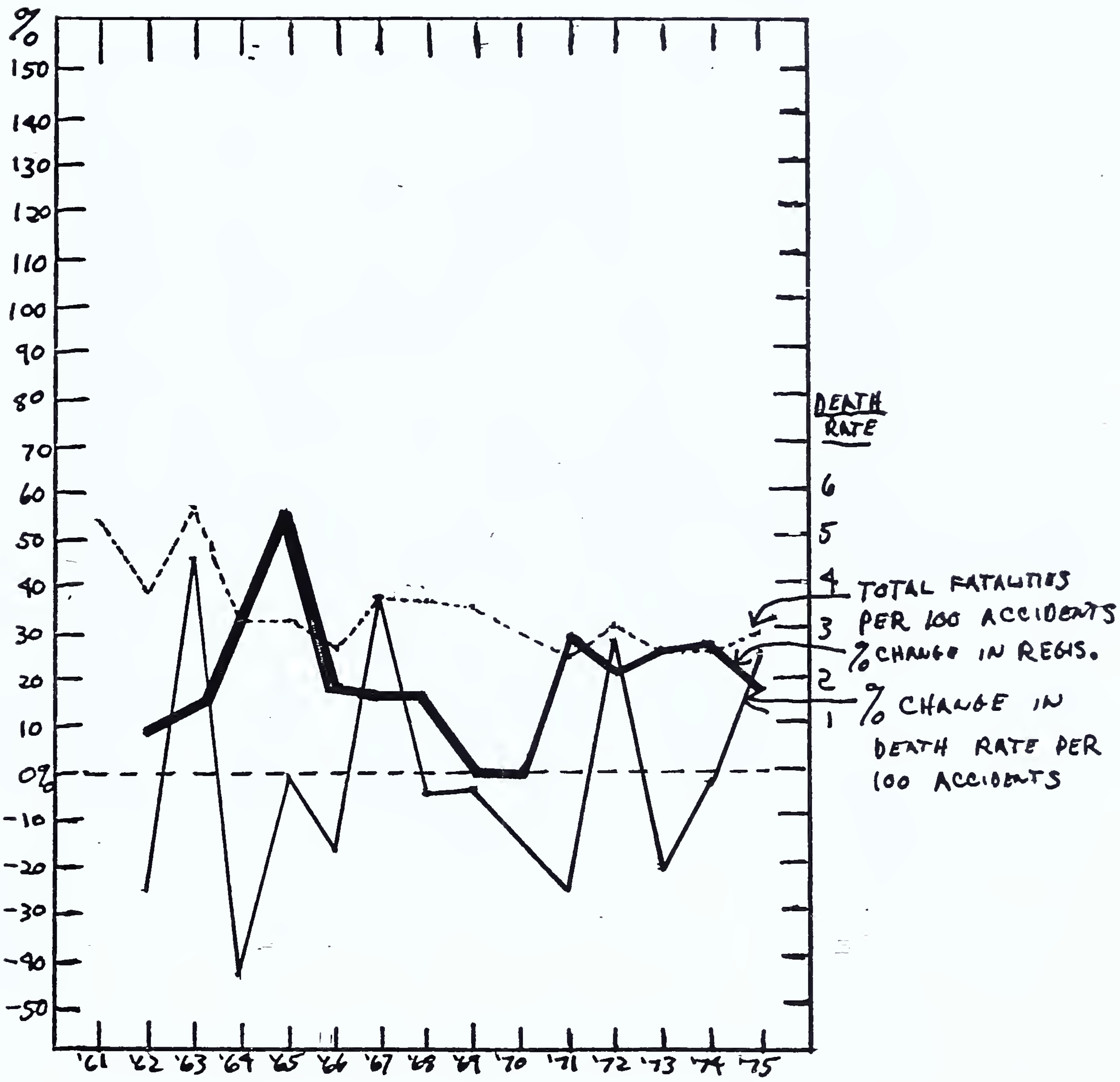
WHEN THE YEARS AFTER THE HELMET LAW (AVERAGE: 82.6) ARE COMPARED WITH THE YEARS BEFORE, (AVERAGE: 77.5), THERE IS A 6% INCREASE IN INJURY ACCIDENTS. PROBABLE CAUSE: HELMETS?

PREPARED BY: Rich Halverson, M.A.U.L. of PA.

BASED ON: Penna. Motorcycle Statistics from Pa. Dept. of Trans.

2A

GRAPHIC STUDY of : FATALITIES PER 100 ACCIDENTS



COMMENTS:

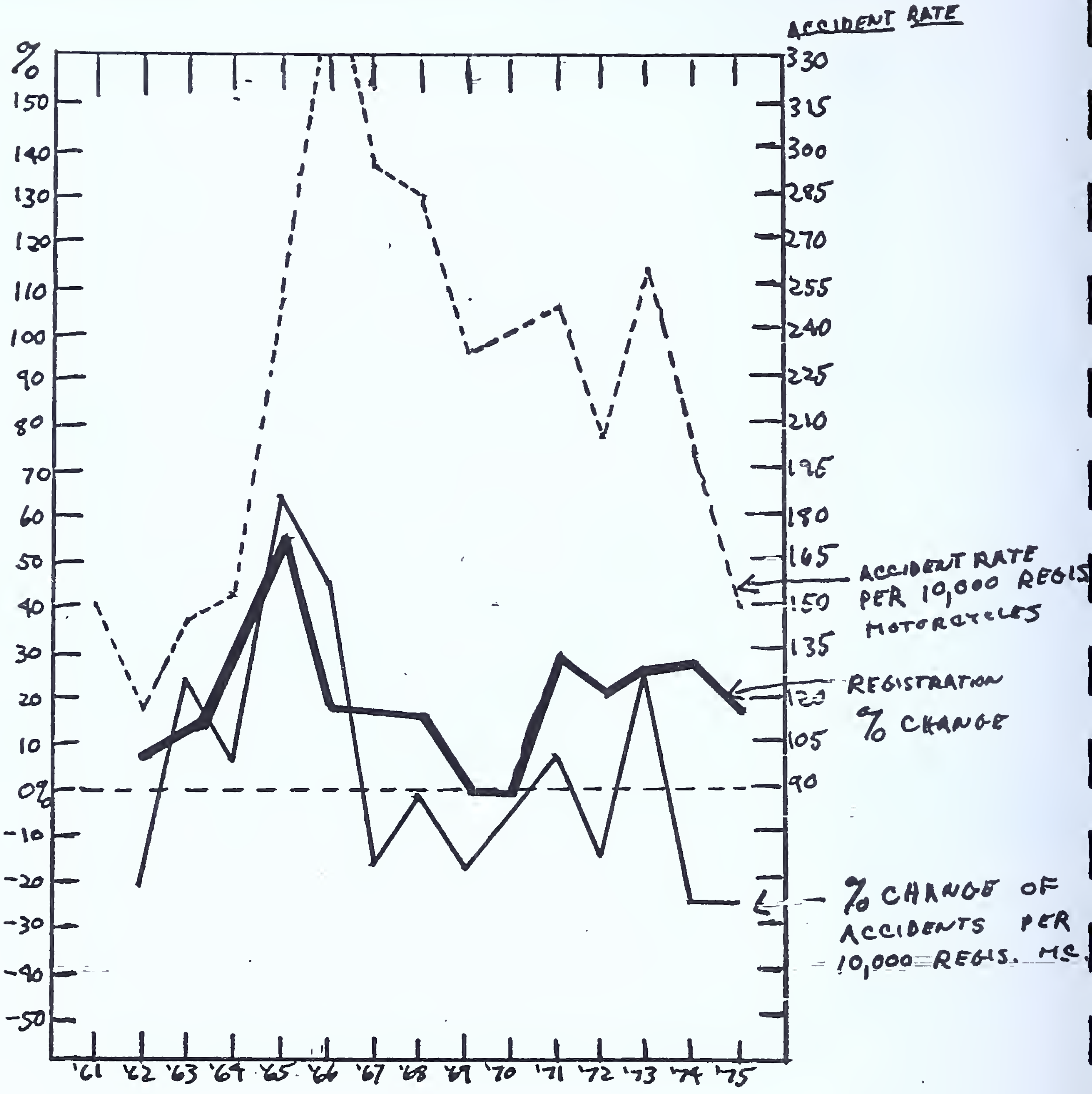
(1970 FIGURES NOT AVAILABLE)
YEARS AFTER HELMET LAW SHOW SLIGHTLY LOWER RATE BUT COMPARED AGAINST EARLY '60's WHERE REGISTRATION AND ACCIDENTS WAS AT ITS HIGHEST RATE. YEARS AFTER HELMET LAW WOULD BE LOWER BECAUSE IT INCLUDED OTHER SAFETY REGULATIONS (INCLUDING SPECIAL LICENSING). NOT NEARLY THE 40-60% DROP IN FATALITIES AS THE FEDERAL GOV'T SAID.

PREPARED BY: Rich Halverson, M.A.U.L. of PA.

BASED ON: Penna. Motorcycle Statistics from Pa. Dept. of Trans.

3B

GRAPHIC STUDY of : ACCIDENT RATE PER 10,00 MC.



COMMENTS:

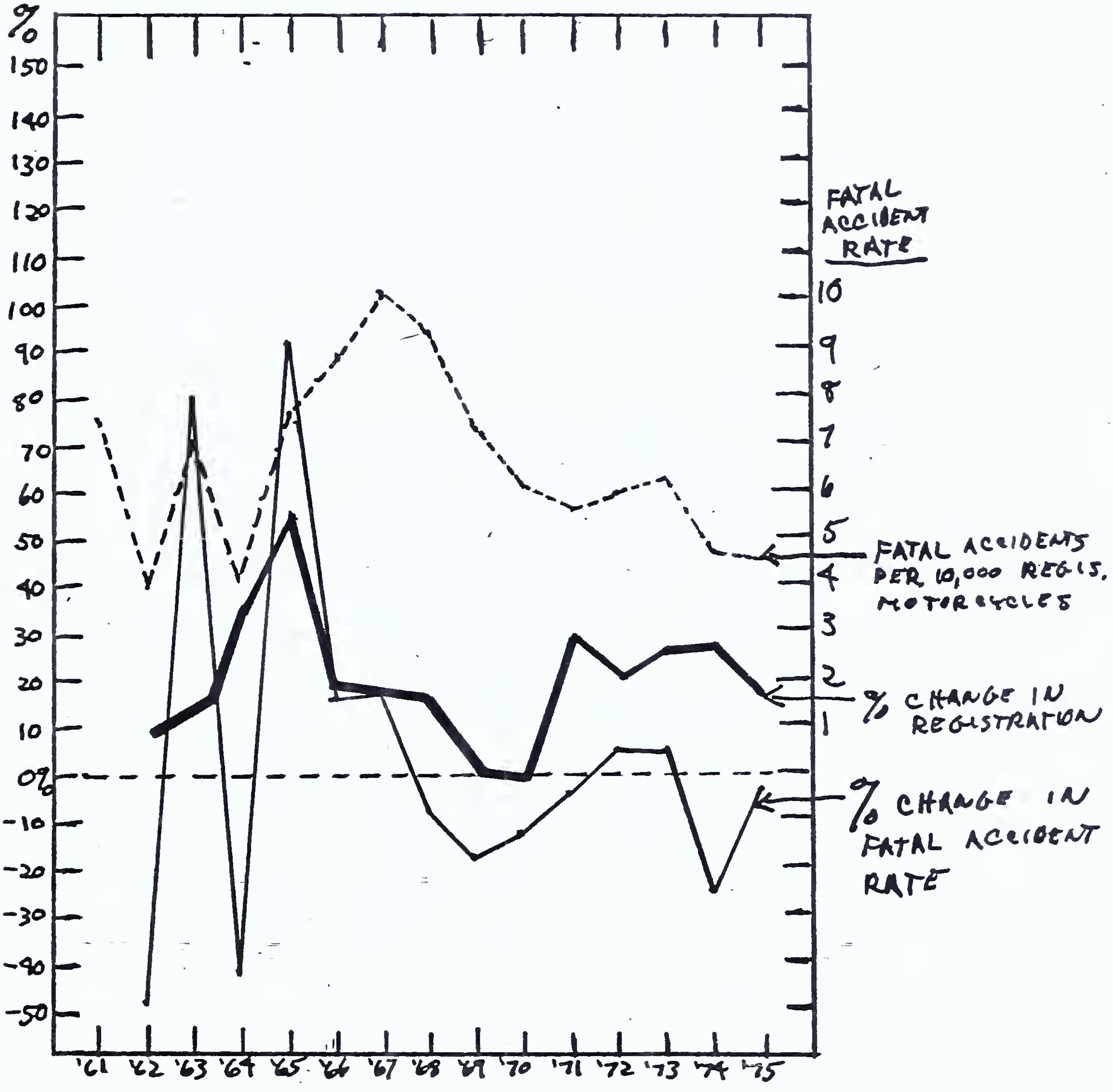
(1970 FIGURES NOT AVALABLE)
SHARP INCREASE OF REGISTRATION IN EARLY '60's, CAUSING MORE INEXPERIENCE RIDER'S ON THE ROAD, SHOWS UP IN MORE ACCIDENTS HERE, AND MORE FATALITIES, AS IN OTHER CHARTS.

PREPARED BY: Rich Halverson, M.A.U.L. of PA.

BASED ON: Penna. Motorcycle Statistics from Pa. Dept. of Trans.

(4A)

GRAPHIC STUDY of : FATAL ACCIDENTS PER 10,000 REG. MOTORCYCLES



COMMENTS:

WHEN THE FATAL ACCIDENT RATE IS COMPARED "BEFORE" + "AFTER" THE HELMET LAW, THE "BEFORE" WOULD BE HIGHER BECAUSE OF EXTREME HIGH REGISTRATION RATE OF EARLY '60'S, CAUSING MORE INEXPERIENCED RIDERS ON THE ROAD, CAUSING HIGHER ACCIDENT RATES. THE "AFTER" WOULD BE LESS BECAUSE OTHER SAFETY LAWS WERE ISSUED (INCLUDING SPECIAL LICENSING). TOTAL REDUCTION IS NOT NEARLY CLOSE TO 40-60% DROP AS FEDERAL GOV'T SAID IT WOULD DO.

PREPARED BY: Rich Halverson, M.A.U.L. of PA.

BASED ON: Penna. Motorcycle Statistics from Pa. Dept. of Trans.

4C

Off with their helmets!

① TMN

Zeller backs cyclists' plea

State Rep. Joseph Zeller has proposed legislation to rescind state law requiring motorcyclists to wear safety helmets.

Said the Emmaus Democrat, "We don't require motorists to wear seatbelts, so why should we impose regulations on motorcyclists?"

The bill, referred to the House Transportation Committee, chaired by Rep. Robert Bellomini, D-Erie, would pertain to over-the-road operation of motorcycles, not cycle meets, and it would not change the requirement that goggles or safety glasses must be worn by cyclists.

"When I first considered the issue," said Zeller, "I had mixed emotions about repealing an act which I then thought helped save lives. But after checking the facts and statistics from other states that have similar requirements and comparing those statistics with states having no requirements, I was surprised at the results.

"There has been no significant increase in the number of injuries or deaths in states with no helmet requirements," he said, adding, "On the other side of the coin, however, there were increasing number of accidents.

"Motorcyclists complained that, in addition to being burdensome and cumbersome in hot weather, helmets interfere with their ability to hear and see properly."

See Page 26, Column 2

Evening
Chronicle
3-11-77

Safety helmets

Continued from Page 25

Zeller said he has received a letter from a Pennsylvania motorcycle association supporting repeal of the helmet requirement. The group, the Pennsylvania Motorcyclist Association for Freedom, said it represents 350,000 registered motorcyclists in the state. The letter, Zeller noted, indicated that in Illinois, which repealed its helmet requirement law in 1969, there was no increase in insurance rates after the repeal.

"Another issue that prompted me to introduce this measure," said Zeller, "is that I frankly don't believe it should be up to the state to tell motorcyclists they have to wear helmets.

"It should strictly be up to the individual to decide," declared the state official.

APPENDIX C

REPORTS OF

RECENT ACTIVITY

1. HURT STUDY - Southern California
2. American Medical Association Conference
3. University of Utah - Helmet Acoustics Tests
4. Discussion Paper - Head Injuries, Maryland

A Federally-funded task team uses riders to find out why other riders have accidents

By Lane Campbell

When an airplane goes down, especially when there is loss of life, a high-powered investigation team springs into action almost the minute the crash is reported. Such a team is called "multi-disciplinary," because it brings together members from many branches of science to sift through the wreckage, the victims' remains, the crew's background, the circumstances, bit by slow bit, looking at every scrap of information from several different angles as they piece together the causes. What an engineer might miss, a psychologist might spot immediately, so they leave almost nothing untouched in their reconstruction of why the accident happened, seeking the ultimate answer — how to prevent it from happening again.

When a biker goes down, as often as not, a single cop arrives on the scene some time after the accident. The rider may or may not be getting the same medical care that, say, an auto driver or pedestrian would get — he (or she) may be beyond needing it. The cop fills out a standardized accident report form (which is usually designed to report auto accidents with no thought of what might be "different" about a motorcycle crash), interviewing the rider if he can talk, other vehicle drivers if involved, sometimes an assortment of witnesses ranging from semi-hysterical to indifferent. At last, when it comes to the line on the form that says "probable cause," the cop (who most likely doesn't ride) will scratch his head, write down "Lost control of motorcycle" and chalk up one more experience to reinforce his belief that all motorcyclists are crazy, if not sub-human.

Had it not been for the controversy over mandatory helmet laws, nothing might have changed. For so long, nobody had cared to learn why bikers crash, at least not with the thrust of money and manpower expended studying disasters in aircraft and other forms of public transport. But the helmet law debate raised serious questions about the federal government's competence to prescribe safety "cures" when they didn't understand the problem. It took the better part of ten years to convince the Feds that neither they, nor anybody else, knew enough about motorcycle accidents, how they happen, why they happen, and how some people manage to survive them.

About the time that biker activists and the AMA were achieving their landmark victory over bureaucracy in Congress, the U.S. Dept. of Transportation (DOT) bureaucrats had decided to contract a university study group to get them the facts they needed, facts that helmet law opponents had correctly pointed out the DOT lacked.

It was a competitive bidding, like most government contracts, and the proposal put together by Dr. Harry Hurt of University of Southern California's Institute of Safety & Systems Management (ISSM) won it. From the biker's standpoint, this was a stroke of great fortune. Dr Hurt is a 40-ish Maico rider who rides the desert whenever he can get the time, and who confesses to a certain paranoia about street riding after literally having to stuff his hands into the pitiable human remains that his work brings him into contact with. Make no mistake, the cost of highway motorcycle accidents, in loss of life, loss of flesh, and human suffering, is heart-breaking to a fellow rider. It is not a "fun" job.

The approach that won the bidding for Hurt was based in part on the "multi-disciplinary" task team concept used by the Federal Aviation Agency to study air disasters — with a twist. Every member of Hurt's investigative team would be an experienced motorcycle rider in his/her own right as a pre-condition of employment. Hurt went on to spell out the types of questions that would be studied, the way the facts would be recorded, the way they'd be massaged by computer analysis. Just as important, he quoted a price that the Feds were prepared to pay.

The contract calls for the Hurt/ISSM team to investigate, over a year and a half, 900 motorcycle accidents, using the same sort of thorough, multi-disciplinary approach as any other disaster team. An additional police report file of 3,600 accidents will be collected to supplement the in-depth data. With some follow-on funding for statistical analysis and additional follow up, they will attempt to answer several questions. What are the human factors in motorcycle crashes/injuries/deaths? What are the machine factors, the environmental (i.e., place, situation, surrounding traffic) factors? And with special emphasis, how effective are helmets?

California being a helmet-optional state, this became an ideal study area. Certain other factors about California, while less pleasant in their implications, helped confirm the Feds' choice. There are probably more bikes, and bikers, in this urban area, combined with a greater amount of good-weather riding days, than any other candidate study area. Lots of bikers, lots of good riding days means lots of accidents, therefore lots of data can be gotten in a short time — if one is ready to go after it.

To be ready, Hurt's USC crew is plugged into the Los Angeles area Fire-Rescue communications net via a sensitive scanner/receiver connected to an automatic tape recorder. Plus, they've established relations with the Los Angeles Police Dept. (LAPD), the California Highway Patrol and the Los Angeles County Sheriffs Department to get instant accident reports by phone. They're ready to "scramble" from their ready room at once — in a white Dodge sedan, for they, too, have become somewhat spooky about street riding. The job gets to you that way.

Once on the scene, they interview every involved person that they can find — including the cops. They inspect the bike(s) and the car(s) involved; they photograph everything that could possibly have a bearing, including a rider's eye view of the approach to the crash site (when they're able to establish the rider's pre-crash path).

"Some of the accidents we investigate never get on police records," Dr. Hurt explained. "A lot of them will involve alky, drugs, illegal aliens. We'll come on the scene, find the skid marks, the scrapes in the pavement, the spilled gas and oil, the blood and snot on the pavement or on a wall — we can reconstruct exactly what happened and pity the poor dude it happened to . . . but he and the bike are gone, spirited away by his buddies."

They pick up every accident-involved helmet they can, reimbursing the owner for a new replacement. Then, they dissect the helmets thoroughly to find how the shell/liner/retention systems performed. In fatality cases, they are often involved in a complete special head-and-neck autopsy procedure to determine the exact extent of head or neck damage. Dr. Hurt credits the Los Angeles coroner, Dr. Thomas Noguchi, with one of the most competent staffs in the country (there are a couple of motorcycle riders among them) and acknowledges the invaluable help from LAPD and Los Angeles Fire Deprt. (LAFD) during the study. "If you're going to crash and want the fastest, best care," Hurt says, "do it in Los Angeles City."

Hurt says the crew, in their yellow study team vests, has had surprisingly good cooperation from the public — especially the motorcycling public, once the rider(s) realize they're talking to fellow riders.

Still, it doesn't come easily. Crash victims aren't always able to talk, and some may never talk again. Police officers may have to respond to another emergency before the team can get to them. Vehicles may be removed from the scene and have to be tracked down. It all means follow-up and follow-up again. Each injury or fatality must be followed through hospital care and/or autopsy. All of it must be done to get the information the Feds are after, and to get it in a form that's relevant to real-life motorcycling.

(Continued on page 33)

PHOTOS BY LANE CAMPBELL

This was one of the "easy" ones. The rider can talk—and walk away.

Multi-disciplinary approach includes tech inspection of the bike.

(Continued from page 5)

The amount of info gathered for each in-depth accident investigation is, to an outside observer, staggering. Here's where the "multi-disciplinary" approach comes in. Someone must know enough about anatomy and medicine to code multiple injuries into a standardized computer language without error. Somebody must know enough about helmet technology to pick headgear apart. They must know traffic systems, police reporting techniques, photography. Data processing skills enter in, too — because the entire accident gets coded into over 500 data points for statistical analysis.

Running like a thread throughout, everybody has to know motorcycling intimately. It's impossible to intelligently ask, or answer, the types of questions on their accident reports without such knowledge. This is because the questions themselves were designed by someone with such a feeling for motorcycles that very little (if anything) of importance has been left out.

As an example, the "environmental factors" report goes into great detail on road surface character — not just what it's made of, but whether it's fresh and grainy or polished smooth, whether or not there are paint stripes, grooves, surface cracks, holes, gratings, manhole covers. If it was wet, it's not enough to say "it was wet." How wet was it? Was there dry pavement but wet paint stripes? Wet pavement but dry tire tracks? Were there puddles, or overall flooding? In addition, they check for view obstructions, categorize the road for both curvature and camber, note the "roadside environment" (gutters, curbs, road edge, obstructions, dropaways), and measure the braking friction coefficient of the road surface. They even go so far as to note the bug population. Now that speaks of intimacy with motorcycling!

When they go into vehicle factors, this same painstaking detail carries through. They know enough to note if the bike was stock, chopped, cafe, or dirt/enduro. They completely cover types of tires and tread condition — going so far as to include roadracing tires as a category, and knowing enough to spot tread wear that comes from "severe cornering." They do a complete technical inspection of the bike when they can get at it, noting every piece of equipment on it, every working control, determining if it was functional at the time of the accident. Were the brakes locked? Did the crash stick the throttle open? What parts of the bike injured the rider (if any)? It's all there.

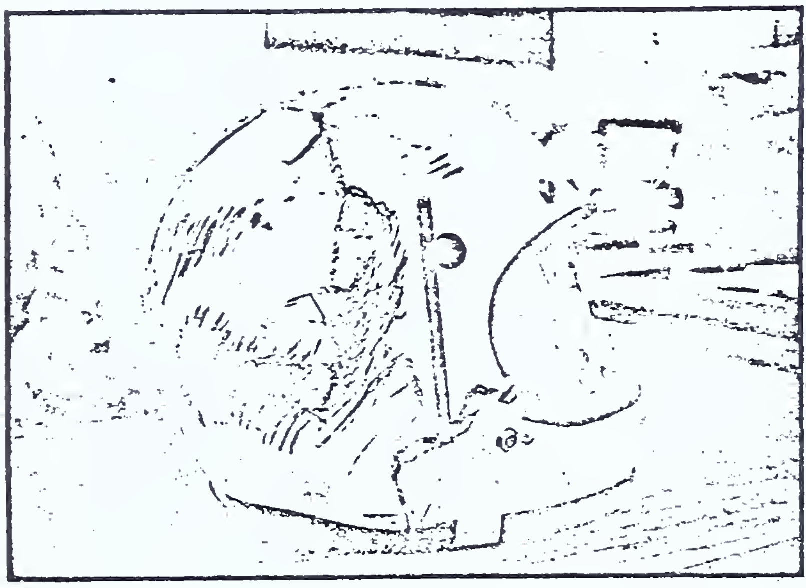
Where riding expertise and judgement really come down hard is in part of the "human factors" section. The investigators have to evaluate, in their own judgement, whether the evasive maneuver (if any) chosen by the accident-involved rider was the correct one, and whether it was performed correctly. That's a heavy responsibility. As far as is known, this is the first time such questions have been formally studied — *from a motorcyclists' standpoint*. Even given the highly subjective nature of such judgement, it's hoped this will provide a kind of accident-prevention data that's heretofore been simply non-existent outside motorcycling's inner circle.

As mentioned before, "it don't come easy." So far, they have worked up over 400 of the contracted 900 accident reports — they are about halfway home. What they've found out so far, as published in preliminary reports, and as related by Dr. Hurt and his crew, will appear next week.

(To be continued)

The Hurt report - Part II

Bikers study street bike crashes, and find that a helmet will save your head, good tires and skill will save your life



This helmet died so its owner wouldn't have to. The wearer sprained his back.

PHOTOS BY LANE CAMPBELL

Helmet analysis. Every impact produces a "signature" on the foam liner, which tells researchers how well the helmet performed. This one did well.

By Lane Campbell

If you ride a mechanically sound motorcycle with good tires, know how to use your brakes correctly, have some dirt riding in your background, ride with your headlight on, or commute to work with a lunchbox, chances are you and people like you will be "under-represented" in the sad parade of accident statistics accumulating in the Hurt study files. These are among the first tentative findings of a half-completed study performed under U.S. Department of Transportation contract by Dr. Harry Hurt and a team of motorcycle-oriented accident investigators at University of Southern California. You are most vulnerable during the first 10 minutes of a short ride, especially if it is during the evening rush hour. And if you do crash, your degree of survivability is dependent on what you're wearing.

Dr. Hurt's team has "worked up" (i.e., completely processed) 400 or more motorcycle accident reports out of a contracted total of 900. They have gone into great detail, with an intimate understanding of motorcycling (all the investigators on the team are experienced riders), searching for the relevant road, machine, and human factors that bear on motorcycle crashes, trying to fill the great gaping holes in official knowledge that presently exist. Most of that knowledge stems from police reports, and Hurt states quite frankly, "Some examples of police reporting are quite bad — good enough for insurance purposes, but not for countermeasures or lawmaking."

In other words, the legal establishment knows enough to fix blame, but not enough to prescribe preventive action. That much is no surprise to a generation of riders. Neither is the Hurt study's confirmation that the greatest cause of car/bike collisions is violation of the motorcyclist's right-of-way by the auto driver. In fact, many widely-held ideas (among bikers, at least) about motorcycle awareness among "other vehicle" operators, rider training and licensing, unsafe equipment, and risk-taking behavior are largely reinforced by these first study findings.

But there are some unpleasant surprises, too, especially when accident causes and crash injuries are examined in detail. And some lessons

For instance, in countless driver/rider interviews, taken after the typical "car turns left in front of motorcycle" scenario, the driver's comments distill down to, "I didn't see him . . . the motorcycle just came out of nowhere"; and the biker's, "That sucker was looking right at me!" Hurt's findings are that the rider gets fooled by apparent eye contact. "You can't count on that," he says, "for that guy's looking right through you, baby. You and he together are the classical deadly pair."

What Hurt is saying is that, to survive, you've got to make yourself conspicuous. Being a conspicuous biker used to mean running wide-open exhausts and indulging in grossly anti-social behavior (a method of arousing "motorcycle awareness" still adhered to by many); but that's all supposed to be illegal. Modern etiquette tends to encourage brightly-colored clothing and lights-on in daylight.

Hurt's early studies indicate that all too few riders dress to be seen. But the real kicker is the degree of under-representation of lights-on riders in car/bike collisions. In round numbers, this might mean that 25-30 percent of commonly observed street riders may have their lights on, but (say) less than one percent of those who are "violated" by a car had their headlight burning. In fact, up until a short time before the preliminary report, the percentage was a big fat zero.

Another group greatly under-represented is dirt riders and former dirt riders. In California, Dr. Hurt estimates that 30 percent of all bikes sold are dirt bikes. Yet people with off-road riding experience figure in less than one percent of the recorded fatalities. Why? Hurt surmises that not only does the dirt-trained beginner learn in a low-pressure environment (i.e., no traffic to worry about), but also the learner gets to experience borderline loss-of-control often enough that he doesn't get rattled by it. Powerslides, braking slides, and the occasional tumble all bend the rider toward "coolness under fire" when panic strikes on the road.

Who are the high-risk people? It is the new rider on the borrowed motorcycle, or the just-bought motorcycle, that stands out in the figures. The point Hurt makes most strongly to the bureaucrats who've hired him is that not only does motorcycling demand special skills, but virtually none of these skills transfer from automobile driving. Braking behavior is an obvious giveaway.

Time and time again, Hurt's crew has recorded crashes in which the rider did no steering whatever, no front wheel braking whatever — simply locked the rear wheel and slid straight as an arrow into the side of a car. Typical case: on Victory Boulevard, a Honda 750 rider with a working stock front disc, approached an intersection at an estimated 45 mph, locked the rear wheel and slid 110 feet, still straight up, striking the car at an estimated 25 mph and somersaulting over the roof. By all rights he should have stopped 25 feet short of impact. This particular victim didn't lose control he abdicated.

What of the risk takers, particularly the cafe and canyon-racer crowd?

"Yes, and we thank the riders very much for those," Hurt quipped. "One Sunday, the motorcycling public almost gave us our whole week's quota on Mulholland between Griffith Park and Roscoemere. We'd gone out to pick up on one guy who'd crashed a 'poor boy' conversion of a Yamaha R5, when in a cloud of dust and a shower of sparks here comes another on a red Norton. While we were on that one corner we collected seven accidents."

Another contributing factor — a machine factor this time — is tires. Again, it shouldn't be any shock to know that motorcycles are extremely sensitive to the state of their rubber. Yet it is to some people. The team's first fatality had less than five pounds of air in his rear tire. Over and over the team finds "square tires" on accident involved bikes. According to team worker Jim Oullet, "The most frequent thing is a Harley-Davidson (5.00x16) tire on the back . . There were times I've thought that tire contributed directly to an accident."

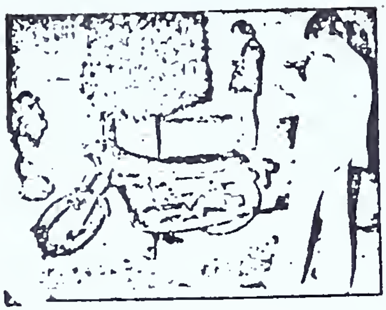
Oullet noticed that not only does the flat-tread profile contribute to loss of control, but also the overall lowering of the bike's frame when modified in the "semi-chopper" mode. Too often, the lowering decreases cornering clearance, the rider does (or knows) nothing about it, and gets into a cornering-clearance crash.

One more strange twist to the research is taken at the Feds' request. It seems a study done in the Southeast indicated that tattooed men were heavily over-represented in auto accidents caused by risk-taking behavior. You got it, Hurt's crew is counting tattoos on accident-involved bikers. No hard core results on that one, yet.

The numbers do tell us that there are lots of 750 Hondas in accidents because there are lots of them on the road; that the fatality rate soars after midnight although the number of crashes is low; that the accident rate peaks during the morning rush, slumps through the day, then hits a four-times-higher peak during evening rush; and that (in California at least) most accidents occur on trips of less than five miles, lasting less than ten minutes — the times when one is least likely to be wearing a helmet.

Helmet myths die hard

If anything sticks out boldly in Hurt's results, it's the fact that today's motorcycle helmets are doing exactly the job they were designed to do — and maybe a little more. Consider the Bell Star that Jim Oullet plunked on the desk in front of me. This one was blitzed — shell shattered in several places, chin strap pulled out, one "D-



Square tires and road surface traction cause the most trouble.

ring," completely gone. A Chevy had run over the rider's head. His injuries were severe sprains of the back and shoulder, plus a cut under his chin from the chin strap.

Another helmet, open-faced, no famous name, had severe shell delamination in the back; and the plastic foam liner (see photo) has a large permanent dent under that spot. This wearer died — of massive internal body injuries. His head was intact.

A third helmet wearer did die of head injuries. His open-faced helmet, not as "blitzed" as the others, is heavily stained with blood. As near as anyone can tell, he and his Gold Wing missed a construction detour at 45-50 mph and endoed several times in the dirt. The heavy bike had landed on his head, possibly more than once.

It may seem heretical to say so, but so far Hurt's helmet studies show little significant difference between a so-called "dime store" helmet and a high-priced racing helmet in a typical street accident. The degree of protection is dependent on how much the helmet covers, not how much it costs. Dr. Hurt says flatly, "If you value your brains, get a full-face and protect your good looks as well." In other words, if it has the appropriate stickies inside it (DOT, SHCA, Z-90) it does the job. Even a shlock helmet is better than nothing. "A helmetless head on pavement is like a watermelon," Hurt says. "I don't need to carry the analogy further."

The best of helmets literally destroy themselves to save your head. A broken shell or a crushed liner is a sign of energy dissipated before it reached the skull. Ouilet pointed out one particular "fatality" helmet. "See this," he said, pointing to several big dings in the inside of the liner. "Sissy bar damage. This is a common fault, especially with the rigid foam liners. Helmet's probably lost most of its shock-absorbing capacity in that area because of the way it's been carried when not in use."

It's ironic that many bare-headed accident victims own a helmet and may even have it in their possession. But not on their heads, not this time. Would a mandatory helmet law change that? The study team's opinion is mixed. Everything they've seen points to the advisability of wearing a helmet (They have yet to come up with a case of a helmet-caused accident or injury, by the way). Yet the most and the worst crashes are on a five minute trip. "Who needs a helmet . . . I'm just going around the corner. I won't get caught . . ." It's still an open question.

Law or no law, Dr. Hurt's injury data seems to confirm "Heyburger's Law" — the immutable theory that whatever piece of protective gear you forgot to wear, surely you'll land on that part of your body. The most common lesion (that's a doctor-word for injury) in motorcycle crashes is abrasion — the classic asphalt rash. When somebody wearing a bathing suit or a tattered pair of shorts goes down hard, it's no laughing matter. One bikini-and-sandals wearer with

(Continued on page 28)

Hurt Report

(Continued from page 13)

road burns over 60 percent of his body spent six months in an intensive care unit. Massive road rash can be worse than massive burns — and more deadly. Burns don't have infectious material ground into them.

Parts of the bike most commonly involved are the gas tank, gas cap and handlebars, all of which can do horrible things to a rider's lower body and upper legs. Dr. Hurt credits Honda and other manufacturers for the move to flush gascap covers and for a carefully-designed "launch ramp" effect between tank and seat to get the lower body clear in a head-on type accident. "Mr. Honda is thinking about the people who buy his motorcycles."

(In fact, all the major manufacturers are thinking hard on this subject, under pressure of product liability law. One bitter irony, in California alone so far, is the fact that the Feds have given California clearance to require a special gastank fill spout on all vehicles (including motorcycles) to mate with vapor-recovery nozzles which will be required at many California gas stations. In other words, just when the manufacturers had begun to standardize on a safe filler cap design (located on the tank centerline) California is going to force them to place the filler off-center to accommodate those special nozzles. Good, conscientious work wasted — for what?)

What happens next

Conspicuity, rider skill, protective equipment — these are the special problem areas Dr. Hurt's study has uncovered so far — and in about that order of importance. Down the road, if bureaucracy takes the findings to heart, may be lights-on legislation, more support for Rider Education, and very likely more pressure for mandatory helmet laws, although there is no clear promise that helmet laws will force greater helmet usage during the most vulnerable time, those short, casual trips. Experience with mandatory seatbelt laws in other countries indicate that it will not, that compliance with the law will surge, peak, then sag back to a level slightly higher than without the law.

Skill, knowledge, conscious choice of good equipment are still where it's at. The tragedy of today's accident statistics is the fact that the necessary skills and information are still held by a minority of motorcycle riders — a "survivor elite." Maybe Hurt's study, properly applied, will change all that. It's up to the survivors to keep a handle on the bureaucracy to see that it does.

ON YOUR HEAD

Research Shatters the Case Against Helmets (and Destroys a Few Other Myths as Well)

by Allan Girdler

What a strange trip this has been. Every couple years one or several members of the responsible motorcycle press does sort of a routine survey and lecture in the form of an article which explains why safety helmets are better than ever, what the various rating standards mean and why you the reader should wear a helmet. We all read the lecture and agree with it except for a few irate chaps who write scathing letters about broken necks, loss of vision and the like.

This article was supposed to be that routine lecture/survey. What follows is something different. Since last surveyed, the situation has changed. In place of preaching we have some bad news:

You must work hard and violate the law if you want to buy a junk helmet.

The standards seem to be far less important than we all thought.

Somebody is finally looking at helmets, bikes and accidents in the real world.

All the rational objections to wearing a helmet can now be spread in your flower bed, where organic fertilizer belongs.

How did we get here?

By accident. Many years ago the various forms of motor sports began using adaptations of flying helmets and football helmets and such. They evolved into leather and cork and plastic and fiberglass and were used almost exclusively by policemen and racers, on motorcycles and in cars and boats.

If you wanted to race you bought a helmet at the bike shop. The technical inspector squeezed it with his thumbs. If it didn't shatter, it was competition approved.

A sad thing happened. A sports car racer wearing a helmet was killed. His helmet did him no good at all.

Suddenly people concerned with such matters realized that nobody really knew a damn thing about helmets. We didn't know what they were supposed to do, we didn't know what happened in a crash and we didn't know how helmets reacted to blows.

Led by an able and dedicated racer and doctor named George Snively, the sports car people created the Snell Foundation, in memory of the man who was killed. They developed the first helmet tests. Working with lab equipment they devised a series of impacts and impact measurements and retention standards. When they had what seemed like a fair test, they set up a random-sample policing method. If a production helmet could pass the test, the model got a sticker. The racing clubs helped by requiring all competitors to use helmets with Snell approval.

Concurrent with this there came the motorcycle boom, bringing an increase in accidents, a larger market for helmets, laws requiring helmet usage and again, a >

need for people to know how to tell good from bad. A government committee worked out a set of standards, some states did the same and the more reputable (a generalization, I know) helmet manufacturers formed a trade association, the Safety Helmet Council of America (SHCA). In general they adopted the federal guidelines and established a certification program, so a helmet buyer would have some way of being sure there had been an attempt to provide the protection he was after.

Things went like this for a couple years. The Z-90 standard was revised and improved and the Snell standard likewise. There developed two parallel lines of testing, with the Z-90 guidelines representing the mass market with a conscience and Snell being the banner waved by hard-core helmet buyers and racers.

There were some other philosophical differences. The federal committee decided vision was an important enough factor to be included in the standard, so they specified that the average head must have at least 120 deg. of vision from within the helmet. The Snell Foundation believed (still does) that more coverage was more likely to be a benefit, so when Bell introduced the complete coverage Star model, with 107 deg. vision on the median head, Snell approved it and the feds didn't. And when the several states got into the standards business, many of them went along with the federal guideline—a word used several times here for reasons which will be explained and issued helmet regulations with the 120 deg. clause included.

The mandatory helmet usage laws which came into vogue a few years back brought along some controversy of their own. Motorcycle riders are known for being individuals and individuals seldom welcome being told what to do, for their own good or not. On the opposite side no politician can resist taking bold and decisive action which sounds fine to the public and only has a real life effect on a few people. When those few people are socially suspect anyway, the political rewards are even better.

We had two fields of impassioned argument. There was the idealistic Constitutional one; can the government protect people from themselves and should the government do so if it's legal? The other question is matter-of-fact; are helmets really good anyway?

About those helmet standards. They were drawn up by experts in the field, by men working without much previous experience. They are lab tests. We don't need details here. The important thing was that the helmet certification and research people drew up their tests as lab tests.

If you instrument a form the size and weight of the human head and drop it from a measured height onto a cubic yard of concrete, you will have a certain and known impact on that form.

If you put that instrumented form inside a helmet and drop it from the same height onto the same block of concrete, the instruments will tell you what the impact was, in terms of g force, so many times the force of gravity. When you know the size and shape of the blow to the unprotected head form, and to the protected head form, you can know the protection.

Set a spike in the concrete and drop a weighted helmet on the spike from a set height and you'll know how well the helmet shell resists being penetrated.

So. We had standards for helmet performance.

We had various state laws controlling helmet usage.

We had some laws and some guidelines about certification, mostly voluntary.

We knew a lot about how helmets performed in the lab.

We argued helmets and their use on faith.

This is a lot of flaws. While the people involved in the research and the enforcement and perhaps the usage were people of good faith and good intentions, there were gaps.

Enforcement was haphazard. If a manufacturer didn't wish to have the Snell Foundation test his wares, he didn't have to. Same for the SHCA. If the helmets had no stickers, why, racers couldn't wear them. If some shoddy outfit joined SHCA and flunked the tests, the council could revoke his membership and take away his stickers.

That left the quick-buck guys with only a few million potential customers. You can guess how hard they worried about that.

Just as serious was that nobody really knew enough about what a helmet should do in real life. Drop tests in the lab may be just like a thrown rider landing on the curb head first. But they may not be like that, either.

And when the pro vs. con debate came back again and again, each side believed they were arguing fact and they weren't. Nobody really knew.

That's the way it was last time we looked.

Things have changed. They've changed so much it's hard to believe we went this long without the changes.

Begin with the end of one major guideline. The federal government now has its own helmet standard, known as DOT-218. (DOT is short for Department of Transportation, under whose auspices the federal highway safety people work.)

As a standard, DOT-218 is pretty much like what used to be known as the Z-90 standard, with limits for performance under impact, penetration and retention.

But DOT-218 is not a guideline. It is a law. That law says anybody who makes or sells for use on public roads a helmet which doesn't meet DOT-218, has the feds for an enemy.

The federal government is a bad outfit to have against you. Failing Snell or SHCA is one thing. They throw you out of the club. Violate federal law and they seize your bank account. Or your person. They go after your customers if you're a manufacturer or your suppliers if you're a retailer.

And the feds are everywhere.

As a result, no prudent person will make or sell a helmet inferior to DOT-218.

An imprudent person can still buy a junk helmet. There are rumored to be sharpies still hanging in there. They find an undeveloped country with cheap labor and they order a pile of trashy, flashy helmets. Tip-toe through the border, a quick tour of the alleys and swap meets and their business is done.

Caveat Emptor. Meanwhile, the new rider, the man or woman who does want a good helmet, something an expert has had a chance to inspect and test and certify, can find one easily. Without effort and without prior knowledge. Even those of us who don't like consumerism, we who doubt that the average person needs all the protection pushed at us, can still approve of this.

If helmets work.

That brings us to the next good news. We can know if helmets are good, if they work and how well, only when we know what happens out there on the street.

We are close to finding out.

Nobody ever said the lab was the answer. Until now there was no known correlation between the tests and the accidents. There were surveys and some research but because there wasn't money for the complete job, there was no complete job.

Thanks to the various safety and consumer campaigns, the money has been made available. The U.S. Department of Transportation has funded a motorcycle accident research program at the University of Southern California's Institute of Safety and Systems Management. This is the most complete and careful and thorough such project ever done. It deserves an article of its own and there is one included in this review package.

We are concerned here with helmets, their use and their effectiveness. Suffice it to begin with the fact that the accident study is professionally done, by trained investigators who are also motorcycle riders. The study is funded to do a complete, even exhaustive, investigation of 900 motorcycle accidents involving injury in the greater Los Angeles area. This is a controlled sample in that the reports will be on the first 900 such accidents to occur during the funding's time period, that is, they can't pick the good ones or the gory ones or adjust in any way.

The project is incomplete at this writing. The research group has completely processed more than 300 accidents.

A 300-accident survey is a large enough sample to use for preliminary conclusions, especially when the trends are as clear as they are in this case.

Begin with helmet use: California has no mandatory helmet law. Between 45 and 50 percent of the riders wear helmets voluntarily. The 50 percent of the riders who don't wear helmets have 70 percent of the accidents which result in injury.

Hypothesis: Wearing a helmet is an admission of accepting a risk. Riders who admit bikes are dangerous are less likely to be hurt than bikers who don't.

In half the accidents with injuries, there were no head injuries. But, Of the bareheaded half who hit their heads, half received a concussion . . . or worse.

There were 100 riders who received injuries in crashes, and whose helmets showed marks of impact or abrasion. Of that 100, a total of two, yes, two, suffered concussions.

Hypothesis and headline: Helmets Work.

There is the other extreme. There have been fatal accidents in this study.

Hugh H. Hurt, Jr., principal investigator for the research group, phrases his findings this way:

"I have seen accidents where a helmet would have done no good.

"I've never seen a helmeted rider die of a blow to the head."

Helmets work.

Considerable stress has been placed on that because the next findings are something of a blow to those of us who've followed and believed in the various helmet standards all these years.

One of the prime advantages of the USC project is that it will compare helmets in real life to the helmets in the lab. The researchers can know, for example, that a 150-lb. man went over the bars at 22 mph, sailed 30 ft. through the air, hit a board

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A Professional Look at Motorcycle Accidents, from the Motorcyclist's Viewpoint

When the U.S. Department of Transportation decided a complete motorcycle accident research project was needed, the outline was roughly this: Investigate every motorcycle accident with injury for a given time in a given area. Determine what happens and to whom and why, in order that the various safety groups can figure out how to reduce motorcycle accidents and lessen the injuries that do (and will) occur.

Sounds simple until a glance at the forms for each investigation show 429 facts to be collected per crash.

The assignment went to the University of Southern California's Institute of Traffic Safety and Systems Management. The institute's first step was to recruit investigators who also ride motorcycles, on the grounds that unless you know bikes, you won't know what to look for in a motorcycle crash.

Principal investigator Hugh H. Hurt, Jr. says the team was found quickly except for the required physician. "You don't see many physicians who ride motorcycles. We did find one who was so interested in the project that she was willing to learn how to ride."

Describing the actual work as painstaking isn't enough.

Each report begins with a radio call over the police and emergency monitor. The survey team goes to the site and measures everything. They interview the rider, the passenger, if there is one, and the people in the other vehicle, if one was involved. They go to the hospital for medical reports and more interviews. They talk to the family, to spectators, anybody who may have something to contribute. The next day, or when weather and time conditions duplicate those of the accident, they go back to the scene and flag down bikes.

They learn first what rider crashed where on what. The second check is to see what bikers ride in that place at that time; was this accident a fluke? Or is there a hazard in the street? Still later, the make and model are fed into the computer, to be checked against registration figures in the area. If Henderson Fours have five percent of the crashes and are five percent of the motorcycle population, that means one thing. If every Henderson Four in the area falls over crossing railroad tracks, that's something else.

One of the report forms ends with the question, "Does the rider have a tattoo?" Odd question, except that psychological studies indicate people with tattoos take more risks than people without them. Given the percentage of the general population with decorations, we can compare that with the percentage of motorcycle riders with a tattoo, and with crashed riders with tattoos, and we'll have some indication of what part risk-taking plays in bike accidents. (Very little, so far.)

All this is very well and all this is something of a preliminary report. The study isn't complete, so the conclusions aren't final.

There are keen trends turning up, though, some of which may save a life, or even allow many riders to feel safer, or vow to improve, or both.

There are all manner of accidents: solo, two bikes, bike vs. car or truck. The median accident, though, one in which any of us could be involved, is almost classic:

The motorcycle is proceeding down the road at the legal speed when an oncoming car turns into the bike's path and the bike hits it. The rider is hurt, the driver isn't. The driver didn't see the motorcycle.

In 80 percent of these accidents, the car was at fault.

Even so, as mentioned earlier, bareheaded riders are more likely to crash than are riders with helmets.

Hurt says his survey shows 25 percent of the street riders in the Los Angeles area have dirt-riding experience. But so few of these riders are involved with serious crashes that they don't show up on the statistics.

A large minority of street motorcyclists ride to and from work. But they aren't hurt in accidents.

Touring is a big part of motorcycling, but riders on long trips don't get hurt, even when riding through town.

This begins to sound like a contradiction. If most of the time the rider is an innocent victim, then surely all types of riders should be getting knocked off their bikes. There is no contradiction. All types of cyclists are getting turned in front of. Some avoid the accident and some don't.

Take one typical case. A man on a 750 with disc front brakes is riding along when a car turns into his path. He skids into the side of the car, somersaults over it and lands on the other side, with only minor scrapes.

The USC team found 110 feet of skid marks and worked out that when the car loomed, the bike was doing 42 mph. Later tests showed that that model bike could be stopped from that speed on that street 25 feet away from the car.

You got it. Stupid drivers don't see motorcycles. They turn into our paths regardless of whether we are experienced riders or not, whether we know how to use the brakes or not.

The rider who is used to reacting quickly, who knows how to swerve and how to brake, doesn't crash. He stops or avoids the car, shakes his fist and rides away. There is no accident-with-injury to report.

One final preliminary word. The investigators ask every bare headed rider how he feels about helmets. About 90 percent of them reply they are in favor of helmets, wear them on long trips and such. It just happened that this trip, just down to the store or over to a buddy's house, they didn't figure the helmet was that important.

End of lecture. ▣

[illegible]
?
Yes.

YOUR HEAD

continued from page 51

fence head first and emerged with a headache.

They can take his helmet back to the lab and know exactly what shape the helmet is in. Then they can subject the helmet to a blow which duplicates the shape the helmet is in. Finally, they can match that blow, that is, the g force to the helmet vs. the g force to the head, against the standards.

Preliminary evidence indicates that the effect of the various standards is less than expected. If the rider's head isn't struck at all, no problem. And if the blow is unsurvivable, the grade of helmet makes no difference.

The middle ground is the important ground. While the research clearly shows the benefits of helmets, the benefit of the top-grade helmet as compared to just any helmet, isn't showing up in the figures.

Naturally, there is reduced injury and some riders in Snell helmets have headaches while the same crash in a tired old helmet would have given them a concussion, but these results are discussed in percentage points.

This is hard (for me) to accept.

Reacting as a survivor of the soup-bowl era and as a rider who has refused to wear anything except a Snell-approved helmet since the Snell Foundation was formed, I didn't want to know that my $75 hand-laid fiberglass shell racing-legal helmet wasn't three times as safe as the $25 DOT-218 polycarbonate shell helmet sold at the corner store.

Dr. Hurt takes a more balanced view.

The helmets built to higher standards are better helmets, in that they can be counted on to absorb more impact. Even if the odds are that the extra protection won't be used, still, it's nice to know it's there.

At the same time, helmet laws and standards should be based on the greatest good for the greatest number. Motorcycling will gain, for riders and the public, if the less-expensive helmets do their job.

Point taken and conceded.

And now, assuming the reader is one of us who wears a helmet because we've always known helmets work, on to the bright side.

The anti-helmet people have made some telling arguments. Helmets are heavy, so it makes sense that a helmet could pendulum your head into an injury. Arguing in favor of loss of vision or hearing is difficult. And it's all too easy to visualize a helmet snagged on a bumper.

These things could happen. Such accidents are possible. Ever since helmets became worth wearing, those of us who wear helmets have accepted the above possibilities as risks worth taking because not wearing a helmet was more risky.

We were wrong.

Know how many crashes surveyed were caused or complicated by impaired vision or hearing?

None.

How many helmets snagged and hurt the rider?

None.

Neck injuries? Riders with helmets have slightly fewer neck injuries than riders without helmets. James Ouellet, who does the injury follow-up studies for the project, says if he cared to play games with the figures (he doesn't) he could make a statistical case for helmets reducing the risk of cervical injury.

The figures up to now show the safety helmet to be cleaner than the seatbelt, in that belts can and do cause minor injuries while saving lives and helmets save lives while doing no harm at all.

In sum, anybody who can afford to buy gas can afford an adequate helmet, and . . .

There's no good reason not to wear a helmet. ◼

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MOTORCYCLE SAFETY
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MEMORANDUM

TO: Participants
Conference on Head Protection for Cyclists

FROM: Lee N. Hames
Director, Safety Education

DATE: May 16, '77

Attached is what we feel was the meat of the Conference on Head Protection for Cyclists, held in Washington, D.C. on April 14, 1977. If you find anything in error, or have any suggestions, please dash a note off to me by return mail, if possible. By the way, we plan to add footnotes and references.

The attached report presents the main points discussed. If we have portrayed the facts accurately, we will easily be able to put them in a proper format for public distribution. Since it takes us quite a long time to get anything into print form, we will, of course, simply duplicate the report in this form until the printed pamphlet is available.

We want to take this opportunity to thank you for giving of your time and energy to participate in the Conference, and to help make possible what we feel will be a very productive clarification of why helmets should be worn.

Again, please give this your immediate attention. If we don't hear from you by May 23, we will assume your concurrence.

Attachment

MEDICAL ASPECTS OF HEAD PROTECTION FOR CYCLISTS
APRIL 14, 1977
Washington, D.C.

A Conference Sponsored by the
American Medical Association

CONFERENCE REPORT

MEDICAL ASPECTS OF HEAD PROTECTION FOR CYCLISTS

INTRODUCTION

Helmets, as a protective device, have been around literally for thousands of years, primarily in the field of military activities. In more recent history, however, they have provided head protection in many areas, such as: contact sports, racing, cycling, and particularly in industry.

Our concern here is with their use in cycling. With the advent of lighter, more economical motorcycles, the number of vehicles has increased tremendously. The number of deaths has risen to almost 3,000 per year, and occurs at a rate more than three times as high as that occurs in automobile crashes. Since the cyclist's head most often makes contact with the road, or some other non-forgiving surface in a crash, the need for head protection is obvious.

The question is what kind of protection. It was not until 1957 that a comprehensive testing program was established to set design standards based upon actual performance requirements in a crash situation. Those standards have become the basis for the American National Standards Institute Z90.1 requirement and the Federal Motor Vehicle Safety Standard No. 218 which was adopted on March 1, 1974. These, then, are the protective devices available, and they are what this paper shall discuss.

Motorcycle crash studies, especially concerning the vulnerability of the unprotected head to serious injury, have been conducted in England, even prior to World War II. This early research indicated that fatalities resulted in more than 90% of crashes involving head injuries. With increased helmet usage starting in 1960, their fatalities from head injuries dropped to about 50%. A general search of the current scientific literature indicates that about 80% of motorcycle-crash injuries are injuries to the head, and that the chance of sustaining a fatal head injury is two-thirds greater for an unhelmeted cyclist. Since head injuries almost always present a crucial problem, it is not at all difficult to justify a serious medical interest, to say nothing of the concern of society, both from a humane and a financial angle. This is especially true, since the majority of cyclists seriously injured or killed are teenagers or young adults.

Physicians and researchers have always been concerned about the overrepresentation of head-related fatalities in motorcycle crashes. The introduction of lighter, less costly cycles, plus the advantage of their use as an economical means of transportation in the present energy crises, would seem to indicate the necessity for continued and even greater concern in the future.

Accordingly, a number of organizations, such as the American Association for Automotive Medicine and the National Safety Council, along with thousands of individual physicians and concerned citizens, have supported mandatory motorcycle helmet legislation. In accordance with the provisions of FHSS No. 3, most states had passed such legislation. In addition, Australian and Canadian Provinces had passed their versions. Some motorcyclists, however, are strongly opposed to any mandatory requirement. In fact, after the power of the U.S. Secretary of Transportation to enforce standards was removed, the cyclists, or their representatives, managed to convince a number of states to repeal their mandatory helmet usage laws in 1976, and more seem to be following their lead.

We are not concerned here with the arguments the motorcyclists use in opposing helmet legislation, except as they relate to questions of morbidity and mortality in motorcycle crashes. However, medical implications have been raised concerning the reliability and efficacy of helmets. It has been claimed, for instance, that helmets do not reduce head injuries, but cause them, and that helmets increase the likelihood of crashes by interfering with vision and hearing. Such claims have been very effective in repealing helmet legislation, with an accompanying great reduction in helmet usage. Such claims can only be proved or refuted by medical research. They involve complicated questions that must be addressed most carefully and from a completely scientific viewpoint.

Accordingly, the American Medical Association invited a group of experts to a Conference in Washington, D.C. on April 14, 1977, to discuss the medical aspects of the overall problem. Although there is interest and need for exploring head protection for drivers and passengers of all motorized cycles, and even those on non-motorized types, the greatest part of the concern is with the driver and passenger of the motorcycle.

The primary objective of the Conference, therefore, was to address, from a medical and scientific viewpoint, a number of issues with medical implications. These included all aspects of helmet usage in which questions of head, neck, and shoulder injuries might be involved. Also addressed were questions of helmetsin relation to vision and hearing; the effects of accessories fastened to the helmet, as well as psychological effects.

Conference participation was limited to 20 individuals, mostly physicians and medically-oriented researchers with experience and background in this area (see Appendix). Representatives of the motorcyclists, as well as the manufacturers, were invited to give us their perspective.

BACKGROUND PRESENTATIONS

As an introduction to the meeting, and to provide a background concerning the motorcycle helmet as a protective system, Dr. Snively gave a brief slide presentation on helmet design, manufacture, and testing. It was pointed out that helmet design, especially in relation to energy absorption capabilities, is not the result of arbitrary decisions, but rather, the result of a sophisticated scientific technique with the sole purpose of protecting the head inside of it. The design, of course, assumes that the helmet will be worn properly.

Perhaps too much emphasis has been placed upon the fact that a cyclist enormously increases his chances of staying alive if he wears a helmet, since cyclists in crashes do not always die -- the incidence of non-fatal head impact is about 20 times that of fatal head injury. Although such injuries may be non-fatal, they often result in crippling and paraplegia. In addition, they often cause permanent and disabling brain injuries, which often do not appear in the morbidity statistics.

Professor Hurt gave a slide presentation on the research currently being done by the multidisciplinary accident investigation (MDAI) team at the University of Southern California. Thus far, of the 471 cases studied, there were no injuries to the head (AIS=0) in the approximately 40% of cyclists who wore helmets. Even in the two fatalities in the helmeted group, which were caused by severe injuries to other parts of the body, the heads were uninjured. This team is working very closely with the Snell Foundation which conducts intensive research on all helmets involved in crashes to determine the extent of damage to both the shell and lining, and to provide real-life crash data on helmet tolerance to impact. Injuries in the unhelmeted consisted of (to be added).

Dr. Newman summarized on-going research in Ottawa, Canada where mandatory helmet legislation has been enacted. While the great majority of cyclists wear helmets, he felt that, on the average, most helmets generally used are not of as good a quality as those in this country, and that his statistics are not comparable with those in U.S. studies. Important to note, however, is that even where cyclists with helmets had head injuries, the vast majority of those were in the minor to moderate categories (AIS2 or less). He stressed that helmets do not cause the injury, but where injuries result, the helmet has already spread the force of the impact, but was not able to eliminate the force entirely.

Dr. Schultz, a plastic and reconstructive surgeon, showed a slide presentation of persons injured in motorcycle crashes. In every case, a full-face coverage helmet would have prevented or lessened the severe temporal and facial injuries sustained by these cyclists, which are of greatest consequence in the severity of the injuries.

These brief slide presentations, added to the scientific literature available, as well as the background and expertise of the Conference participants, provided the framework for Conference deliberations.

DISCUSSION ON DIRECT MEDICAL ASPECTS

1. Cervical Spine

Definitive research directly relating cervical spine injuries to helmet usage is, of course, needed. However, there is no evidence to indicate that motorcycle helmets cause the spinal injuries that are occassionally found in helmeted cyclists. Based upon currently available scientific literature, personal experiences, and background, and a study some years ago involving 1,630 cases of football helmet *wearers, cervical spine injuries are possible, whether or not the cyclist is wearing a helmet, depending upon the circumstances of the accident, but helmets do not of themselves contribute to or worsen the injury.*

The majority of cervical spine fractures are usually caused by flexion, not hyperextension. As helmet design becomes more sophisticated and more protective of the head, these improvements may increase one's chances of flexion. However, it is obvious that energy not absorbed by the head is not necessarily absorbed by the neck -- the principle of energy transformation is much more complex than that.

Based upon the evidence, the likelihood of neck injury caused by the helmet is almost impossible. And if the forces were strong enough to result in such an impact with a helmet, they would certainly cause fatal head injuries to the unhelmeted cyclist. And certainly, if the cyclist refuses to wear a helmet for this reason, he is inviting these injuries.

The question of head rotation inside the helmet was addressed. There is no evidence to support the contention that a helmet, if properly fitted and properly worn, causes head or neck injury as a result of head rotation. Rotation of the helmet itself on certain types of impact was considered. This situation can be a problem in identifying injury attenuation, because in some cases, it may appear that the helmet caused the injury, when, in fact, the helmet rotated, exposing the head to injury, and then rotated back to cover the injury. This may occur when the chin strap is worn loosely or is unfastened.

2. Clavicle

During the 1960s, full-facial coverage helmets were banned from racing events in England, because there was suspicion that they contributed unnecessarily to clavicle injuries. However, experience proved that there was no difference in clavicle injuries.

Clinical examination of cases involving clavicle injuries indicates that these result from the elbow or arm impacting with an exterior object, thus forcing a transfer of energy to the clavicle. The injury patterns in these cases show clearly that such injuries could not be caused by the helmet.

3. Chin Strap and Chin Cup

Two issues are generally raised when discussing the chin strap: (1) Does the strap itself cause injury? (2) Is the maximum breaking strength too high?

There was consensus that the chin strap, as presently designed, is not a causative factor in neck injury, if properly worn.

In answer to the second issue, there is evidence to show that, even at a breaking strength in excess of 600 lbs., which is greater than the force experienced in motorcycle crashes, the most significant injury will be a minor abrasion.

There is very little data concerning the injury potential of the chin cup itself. It is not known if it helps to keep the helmet on the head, or how much it influences the position of the helmet. For this reason, the Safety Helmet Council of America strongly urges that chin cups not be used. They are likewise banned in Great Britain.

4. Peripheral Vision

Opponents of helmet usage claim that helmet wearing causes a definite serious reduction in peripheral vision. A recent study of the National Highway Traffic Safety Administration has proven that full coverage helmets, the most common type in use, restrict horizontal peripheral vision by less than 3% from an unhelmeted cyclist. In addition, the full-facial coverage helmet, which complies with both ANSI Z90.1 and FMVSS No. 218 provides a peripheral restriction only slightly more than the full coverage helmet. Furthermore, all approved helmets tested exceed the maximum state licensing requirement for operators of motor vehicles; namely, 140^{o} total peripheral vision in the horizontal plane.

It was further reported that information obtained from the USC MDAI team documents that the great majority of crashes occur well within the 40^{o} field of vision directly to the front of the cyslist, thus negating the peripheral vision argument, even if it had validity in the first place.

Should the field of vision be extended in present day helmets? The group felt that such extention would add to the injury rate; since it would be necessary to cut away a larger amount of the helmet, thus affording less protection to the crucial upper facial and temporal areas.

5. Helmet Weight

Helmet weight varies considerably, depending upon design, construction, and materials used. The weight of the helmet per se, however, is not nearly as important as the center of gravity.

If the center of gravity of the helmeted head is basically the same as that of the head itself, the wearer should not experience injury. The situation is not the same as in a motor-vehicle crash, where the body is restrained -- in motorcycle crashes, the body of the cyclist can move along with the head and neck; so the weight added by the helmet will not exacerbate the problem. It is verified that automobile race drivers, whose helmet weight was increased considerably several years ago, and where this information is monitored closely, do not show any increase in neck injuries.

A more important consideration than weight is the thickness of the helmet, since it has been proven that performance upon impact is enormously different in helmets with as little as 1/2" difference in thickness.

The possibility of rider fatigue caused by strained neck muscles resulting from heavier helmets was raised. It was pointed out that it is important for a motorcyclist to move his head back and forth continually to stay abreast of the changing traffic environment, but the helmet weight is not sufficient to cause a significant accident potential. In addition, although we do not know of any research to document the effects of heavier vs. lighter helmets, there are numerous case studies and personal interviews indicating that riders are able to accommodate easily to any helmet within a several pound differential, and do not experience problems directly related to helmet weight.

6. Auditory Aspects

As with visual impairment, allegations have been made that helmets seriously impair hearing capability.

Motorcycles create noise of about 105 dbls. Obviously, it is necessary that, in order for a cyclist to hear any noise, it must be louder than that resulting from the cycle. Consequently, as long as the rider can hear the motorcycle itself while wearing a helmet, he can also hear any other sound with a favorable signal-to-noise ratio--one greater than 105 dbls.

The helmet does reduce the loudness of both the sound of interest and the motorcycle noise proportionately, but does not alter the signal-to-noise ratio between the two sounds. Critical traffic signals are not lost, and, in fact, may be helped -- when wind noise is minimized -- the more critical sounds become louder.

It has been claimed that helmets can cause hearing damage. To the contrary, the helmeted cyclist is subjected to only 93 dbls. in a situation where the unhelmeted cyclist is subjected to 105 dbls. While deafness can result from continuous exposure even at the lower rate, the allegation that helmets are responsible for hearing loss is patently ridiculous.

DISCUSSION ON RELATED MEDICAL ASPECTS

1. Alcohol Involvement

A number of recent studies, including one done among military personnel, indicate that alcohol is involved in a disproportionate number of motorcycle crashes involving fatalities. In fact, the

USC MDAI team found that alcohol was involved in over 50% of the motorcycle fatalities it investigated. It was pointed out that alcohol-related motorcycle crashes are very similar to those involving motor vehicles and are far too common, and add tremendously to the problem.

2. Speed

The USC MDAI team, through vehicle deformity studies, indicates that excessive speed is not a factor in the majority of motorcycle crashes. In fact, California statistics show that the majority of crashes occur at an average speed of 32 mph.

In motorcycle accidents involving excessive speed, the helmet should not be indicted for not affording adequate protection, because, at upper limits, no protective system can be effective.

3. Effects of Accessories

An increasing number of cyclists are adding accessories to the helmet, many of which are purely for decorative purposes. It was emphasized that any added equipment, such as rear-view mirrors or visers that necessitate drilling holes in the helmet, alters the structural integrity of the helmet and is therefore extremely hazardous. In addition, these effects, if not flexible or breakaway, can have extremely dangerous results upon impact.

4. Darkened Visers

Many cyclists use darkened visers or face shields that provide full-face coverage. While the intent of these devices is good, the cyclist sometimes continues to use them for night driving as well, and is obviously not aware of the gradual visual impairment that occurs. There are at least 4 accident cases reported in the literature involving darkened visers.

5. Thermal Aspects

There was little argument concerning the fact that the helmet does cause a certain amount of discomfort during warm weather. However, there is no documentation to translate this discomfort into increased crash hazard.

6. Sense of Overconfidence

Some critics have pointed to the fact that helmets provide the cyclist with a false sense of security, thus encouraging him to take unnecessary risks. There is evidence that cyclists who wear helmets, when not required by law to do so, are generally safer drivers -- conversely, it is probably true also that cyclists who choose not to wear helmets do not associate the danger involved and are willing to take more risks than the holmeted cyclist.

7. Improper Helmet Removal

There was interest expressed about the possibility of EMS and/or ambulance personnel inflicting serious neck injury if they are not trained in how to remove a helmet from an injured cyclist. Two persons should be used; one to place his hands inside the helmet in order to hold the head rigid, and the other to pull the helmet open and remove it.

It was stated that the American College of Surgeons has recently revised its emergency training manual and a section has been included on proper helmet removal.

CONFERENCE RECOMMENDATIONS

A number of recommendations are implicit in the foregoing material, but because of the gravity of the matter, they are set forth here clearly and precisely. The recommendations are based upon the expertise and research experience of the Conference attendees, as well as upon a preponderence of evidence in currently available scientific literature. The recommendations are:

1. Every individual who drives or rides a motorcycle, should wear a properly fitted approved helmet.
2. Full facial coverage helmets are strongly recommended, because of the extra protection they afford.
3. Since moped crashes subject victims to the same type of trauma hazards that endanger motorcyclists, mopedists should also wear helmets.
4. Bicyclists would be well advised to wear helmets, because when involved in an automotive crash, they are exposed to motorcycle crash forces.

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TOP OF THE NEWS

Nearly a million Big 5 bikes hit the road in '76, says MIC

Newport Beach, Calif. -- Some 986,415 Harley-Davidson, Honda, Kawasaki, Suzuki, and Yamaha motorcycles were sold in the U.S. in 1976, according to statistics just released by the Motorcycle Industry Council.

This represents a gain of 169,206, or 20.7% from the 1975 sales totals.

The estimated retail value of the sales for 1976 is $1,219,157,000, a gain of $181,963,000, representing a 17.5% increase for the year.

On the wholesale level, the price sold to dealers f.o.b. point of manufacture or point of entry, the sales amounted to $945,142,000, up 18.5%, or $147,373,000 estimated sales, from 1975 totals.

MIC's report breaks down the sales on a month-by-month, state-by-state basis, and compares sales statistics according to engine displacement, off-road, on-road, and combination, and by 2-stroke, 4-stroke, and other engine types.

In a subsequent report, MIC statistics show that the number of units sold in January, 1977, 79,971, exceeds the number sold in January, 1976, by 31,017 units, a gain of 63.4% for the month compared to the same period a year prior. This is the largest number of units sold since October, 1976, when 96,060 were marketed. The value of January's sales on the wholesale level were $81,573,000, up 72.6% from the same month in the prior year, and on the retail level, there were estimated at $103,716,000, up 70.4%. Both of these figures are higher than October, 1976, which would indicate either higher prices or higher-priced bikes being put on the market.

MTA doesn't feel Harley parts ads anything too exciting

Alexandria, Va. — The Motorcycle Trades Association is not lining up alongside those aftermarket suppliers who feel Harley Davidson's "other people's parts" ads are "derogatory to the industry."

The executive director of MTA, Gary Throneberry, has told industry leaders and MTA members that the HD ads, which appeal to purists to use only HD replacement parts, are "head on, hard hitting, no holds barred competition," but Throneberry said he disagreed with a trade publication editor who called the HD program "a kick in the crotch."

Throneberry said he felt, personally, that HD has a right to fight for brand identification, and that other aftermarket manufacturers have a similar right to convince HD owners that their replacement parts are just as good as the original equipment.

Barry Sheene pushes for U.S. 'start money'

Start money would get more international riders

Daytona Beach, Fla. — The spectre of "start" money hung over the Daytona 200 this year, as Barry Sheene, 500cc world champion, complained that Daytona wouldn't pad his pockets.

Interviewed by John Bethea, editor of *Motorcycle Weekly*, Sheene said that as the world champion, he gets about $1,400" to attend an event. "If Daytona paid start money, I think I would want to ride there much more," he said as he joined Italy's Giacomo Agostini in skipping the races because of the start money, or lack of it.

Sheene said that all Grand Prix even [redacted] required by the FIM to give "each and [redacted] starter a set amount in start money [redacted] amoung ranges according to the p [redacted] experience and drawing power." Sheen [redacted] America is "behind the rest of the world [redacted] it comes to paying start money." At [redacted] international events, he noted, the start [redacted] isn't required "but negotiations between [redacted] and promoter still occur and it helps th [redacted] get from one event to the next."

In Venezuela, where Sheene and A [redacted] started their 1977 seasons, Agostino rep [redacted] asked for and received $9,000 "just t [redacted] up," according to Bethea. "Let's face [redacted] quotes Sheene as saying, "this is a busin [redacted]

Of course, the attitude of the [redacted] promoters in America is that the m [redacted] there to be won. "If these guys are confi [redacted] their skills, all they have to do to coll [redacted] win on the American circuit," said one.

Dealernews studied by pos [redacted] authorities for ad ratio

Gardena, Calif. — This post office [redacted] ch has asked the United States Postal Se [redacted] or a ruling as to whether or not *Mo* [redacted] *le Dealernews*, published b [redacted] e William/Lawrence Corporation, has [redacted] ed the provisions under which it is maile [redacted] at controlled circulation postal rates.

According to Keith Smith, c [redacted] of Gardena's controlled circulation department, the January and February issues were forwarded to postal officials to determine if the two issues exceeded the 75% allowable advertising content. After another postal official, Paul Lipton of the Inglewood Branch, received an earlier ruling relative to the "products" section, the mailers for The William Lawrence Corporation marked up the February issue so that only 12% of the issue was shown to be "non-advertising."

However, an official with the U.S. Postal Service in Washington, D.C., said that "product releases" are not now considered advertising: if so, approximately 100% of the content of *Motorcycle Product News* would have to be classified as advertising, for example, and there are other publications in other fields which carry product releases exclusively.

Nevertheless, according to Smith, the February issue of *Dealernews*, even counting the product releases as editorial, was so close to the limit that he felt he should ask authorities for a second ruling.

The 75%-25% requirement was established so that trade publications could mail their issues under a tax-subsidized rate structure, under the concept that industries need a strong trade press. A 75% advertising allowance was [redacted]

Helmets lower hearing risk, help riders hear warnings

Salt Lake City, Utah — Motorcycle helmets significantly lower the long term risk of hearing damage from wind noise and engine noise and enhance a rider's ability to detect sirens and other warning signals, according to an engineering study just completed by the University of Utah.

The researchers found that most noise experienced by riders of quiet motorcycles is from air flow around the head. By reducing this noise, the helmets make it easier for the wearer to distinguish warning signals in traffic.

Furthermore, heavy users of bikes may be threatened with hearing loss.

A recorded police siren was used in the noise transmission loss tests conducted by Dr. William Van Moorhem and Kevin P. Shepherd, a research associate in acoustics. The tests were conducted at speeds ranging from 20 to 60 miles per hour. They showed that the noise intensity at a biker's ear dropped approximately 20 decibels when a helmet was worn.

"Under no circumstances did the helmet put its wearer at a disadvantage with respect to detecting warning signals," said Dr. Van Moorhem.

Motorcycle Head Injuries
Maryland Department of Traffic Safety
May 5, 1977

This represents a two-year period of study from January of 1973 to December of 1975. What we're dealing with is only serious injuries and deaths; we're not dealing with minor injuries because this is the Maryland Institute for Emergency Medical Patient Profiles, which is, of course, our shock trauma unit at the University of Maryland Hospital in Baltimore. The two overall profiles include those that died at the shock trauma unit and then, everyone at the shock trauma unit. Those that died are a white male who is 25.2 years of age who most likely has a head injury and who most likely died during the period from 8:00 p.m. to midnight. That's the greatest frequency. Forty-two percent were head injuries, 35 percent died between 8:00 p.m. and midnight, which goes along with the data that's been released before because the motorcycle itself tends to be an invisible vehicle even during the daytime. At night it becomes much more suspect. If we add the two mini-bike deaths that occurred to that, it lowers the age. One was eight and one was fourteen. It still only lowers the average of our profile to 24.1, which gives us an indication that the most likely person killed is not going to be the one 16 to 18. That's certainly not what's happening over a two-year period.

What I figured out based on my data is that you're only addressing 13% of the population by requiring those under 18 to wear helmets. Eighty-seven percent of the population would not be affected.

Now, the profile of the alive, those that survived, again we're dealing with the white male, again the age is 24.9 for just those who are licensed. If you add the 13, there were 13 under 16 that were involved in various types of mini-bike accidents, then the age is 25.3. The most likely injury, it changes a little bit, is musculoskeletal, with 34 percent. Head drops to 25 percent in those who survived. With some sort of protection, as long as the head isn't damaged, we can do almost any kind of repair with the body as long as it isn't the head. Above the neck we have a little problem, so in the serious injuries, and I'll give you the whole list of these because they are interesting. You hear a lot of discussion about neck injuries. Neck injuries are relatively insignificant both in the dead and in the ones who survive in shock trauma. It's the last of the listed and it's listed together with serious facial injuries and together they only add up to 9 percent. Musculoskeletal is 34 percent; head or central nervous system is 25 percent; abdomin/pelvis serious injuries is 18 percent; thorax is 14 percent; and face and neck combined is 9 percent. We find a shift in the seriously injured, it may well be that the seriously injured that are surviving are seriously injured between 4:00 p.m. and 8:00 p.m., which as you remember was the second category for the dead. This may have something to do with the fact that in most cases we're dealing with a far more populated highway system and there may well have been treatment earlier. We don't know that, we don't know why this is occurring, but the shift is in the seriously injured. Thirty percent are injured between 4:00 p.m. and 8:00 p.m.; 25 percent are injured between 8:00 p.m. and midnight and 21 percent are injured from midnight to 6:00 a.m. That leaves only 22 percent for the other ten hour period from 6:00 a.m. to 4:00 p.m. So during ten hours only 22 percent are injured or killed and the others are all killed in evening and dark hours. We're dealing with 155 subjects over a 3 year period. Now I have some cost data which you might find interesting. This gets interesting here. We had over the three-year period, 1,588 days as a result of motorcycle accidents in our shock trauma unit at a cost of $650 per day. That gives us a total if we extend it over that three-year period, of $1,320,200 for treatment of accidents or injuries on motorcycles. Now, we have a helmet law. We'll get to what it's going to cost us without a helmet law. That averages out to 529 days per year and the cost per year would be $343,850, January 1 of '72 to December of '73. We have a central tendency that indicates the older the person gets, the more likely he is to spend more time in shock trauma. In other words, they don't heal as fast. So as you get into your higher ages, you tend to spend a little longer time there. If the individual cannot pay this, then society has to pay it. There's no other way it's going to get paid. If a guy's out there on a motorcycle and gets himself hurt, then somebody's got to pay it and it still costs $650 a day. I've taken this information based on 1975 data using an average of 529 days per year, and I went to 1977 and say okay, let's say we take away the helmet law and in 1977 if we have only a 10 percent increase in injuries, the 529 days goes to 582 days and it goes from a cost of $343,000 to a cost of $408,564. Now, if we do the same thing and we become more realistic, the estimates are that we're going to have anywhere from a 40 percent to 50 percent increase in serious injury and death without a helmet law, then we're talking of going from $343,000 to over a half a million. At 40 percent it would be $520,182. That is with no increase from $650 a day. Just for our one shock trauma unit. We're not talking about any injuries in any other hospitals. If you add 8 percent inflation, and we know hospitals have been averaging about 15%, in 1977 the per day cost would go to $702 instead of $650. By 1980 the cost per day will be $885 and that's only with 8 percent inflation.

The shock trauma unit gave me this estimate of what it would cost per day in the unit. The unit is a highly sophisticated unit which is for treating shock and trauma patients who are near death or are very seriously injured. This would be all of the costs incurred. There are staff costs, medical treatment, specialized treatment, for instance the machinery, and this sort of thing. That's just an average.

If they have Blue Shield and major medical, then it would pick up that cost. Unfortunately, the Blue Shield people indicate that the age groups of 20 to 25 are the most likely age group not to have Blue Shield or Blue Cross.

All I'm talking about is the emergency medical care for serious and fatal injuries. When we start getting into rehabilitative care that's not done in the shock trauma unit. As soon as they can leave the shock trauma unit they're sent to another hospital or another wing. They're never kept there beyond their stability.

Of the 155 that were treated at the shock trauma unit in a three-year period 82.2 percent survived. Now that's an outstanding survival rate. The shock trauma unit is geared to get them to live. Now, the subsequent...unfortunately we have no way of following up these people beyond the shock trauma. Now I do have a coded list of prognoses that the doctors use and I've never been able to break that code down because I don't have the right book and it would take forever. There are lists and lists of these numbers that are coded so that any doctor later on can look and see what kind of treatment he got and what the prognosis was. But to follow these people would take a tremendous amount of analysis and I haven't done that so I can't tell you how many of them were permanently injured, how many of them were crippled, how many of them were vegetables, I just have no way of knowing. Seventeen and two-tenths percent died, which is not a high death rate considering the amount of injuries these people get when they're brought to the unit. They're not brought to the unit unless they are very seriously injured. One-hundred-and-forty-five males and ten were females. One-hundred-and-forty-eight of them were white, seven were black. That is not consistent with our licensing pattern.

The licensing pattern indicates about 15 percent are female licensed and about 24 percent are black.

The wild guys are the white males. There isn't any question about it. It is so overwhelming in this data.

The potential here is staggering for the amount of the loss. The societal loss is potentially tremendous if we take away helmets, because there's almost a guarantee that you're going to get a 40 percent to 50 percent increase in serious injuries and deaths on motorcycles.

I've seen data that indicate 20 percent. But that's not enough data yet for me to say 20 percent. Because really you have a residual time of probably six months to a year before people who would take their helmets off will. As they get careless or lazy about wearing the helmit or carrying it someplace, it takes awhile to get rid of that habit. It's a good habit. When you have a habit you just keep on doing it. Now, you pretty much have to make a conscious effort to break the habit. That's why it's difficult to say after six months or so of not having helmet laws that's what it's going to be. If it's really 20 percent in six months I'm really worried about what it's going to be in 18 months.

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APPENDIX D

BIBLIOGRAPHY

HELMET BIBLIOGRAPHY

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APPENDIX E

ATTITUDES AND OPINIONS
ON
THE HELMET ISSUE
IN
PENNSYLVANIA

Chilton Research Services
Radnor, Pennsylvania

Study #9461
July, 1977

Interview # ____________
(1 - 4)

MOTORCYCLE HELMET STUDY

Screening Form

Time began _____AM_____PM

Time ended _____AM_____PM

Hello, I'm _____ calling from Philadelphia for the Govenor's Traffic Safety Council. We are interested in the opinions of Pennsylvania residents regarding some vital highway safety issues. Your household was selected to represent those in your area. So that I may know who in your household to speak with, please tell me . . . . (GO DIRECTLY TO QUESTION A)

A. The number of people 18 years of age and over, including yourself, who are presently living in this household.

________________ People
(5-)

B. Now, starting with the oldest down to the youngest, please tell me the ages of the males 18 or older (RECORD IN GRID BELOW. CIRCLE SEX AND RECORD AGE OF EACH MALE 18 OR OLDER)

C. Again, starting with the oldest down to the youngest, please tell me the ages of each of the females 18 years or older (CIRCLE SEX AND RECORD AGE FOR EACH FEMALE 18 OR OLDER)

Line #	Sex		Ages						
1	M	F		[✓ 1]					
2	M	F		1	[✓ 2]				
3	M	F		1	[✓ 2]	3			
4	M	F		1	[✓ 2]	3	4		
5	M	F		1	[✓ 2]	3	4	5	
6	M	F		1	[✓ 2]	3	4	5	6

(USE GRID TO SELECT RESPONDENT. CIRCLE THE LINE # FOR THE DESIGNATED RESPONDENT, AND ASK THE FOLLOWING:)

I am to speak to the ________ year old male/female in your household. Is he/she available?

(IF DESIGNATED RESPONDENT IS NOT AT HOME, FIND OUT BEST TIME TO REACH HIM/HER AND RECORD ON RANDOM NUMBER SLIP. ATTACH RANDOM NUMBER SHEET TO SCREENING FORM.)

(IF CALLBACK:) Designated Respondent's Name:_________________________________

1. Do you think the 55 MPH speed limit is effective in reducing injuries?

6-

Yes	1
No	2
Don't Know	V

2. Do you think seat belts are effective in reducing injuries?

7-

Yes	1
No	2
Don't Know	V

3. Do you think that operating motorcycles with lignts on during the day helps avoid accidents?

8-

Yes	1
No	2
Don't Know	V

4. Do you think use of helmets by motorcyclists is effective in reducing injuries?

9-

Yes	1
No	2
Don't Know	V

5. In your opinion, should the government require a maximum 55 MPH speed limit?

10-

Yes	1
No	2
Don't Know	V

6. In your opinion, should the government require mandatory use of seat belts?

11-

Yes	1
No	2
Don't Know	V

7. In your opinion, should the government require mandatory operation of motorcycles with lights on?

12-

Yes	1
No	2
Don't Know	V

8. In your opinion, should the government require mandatory use of motorcycle helmets?

13-

Yes	1
No	2
Don't Know	V

9. Are you aware that there was a major change in Pennsylvania's traffic laws on July 1?

14-

Yes	1
No	2
Don't Know	V

10. Does a licensed motorcycle operator reside in your household?

15-

Yes	1
No	2
Don't Know	V

11. Are you a registered voter?

16-

Yes	1
No	2
Don't Know	V

12. What is your age? (IF RESPONDENT HESITATES, ASK WHICH OF THE FOLLOWING AGE CATEGORIES HE/SHE FITS INTO)

17-

Under 18	1
18 - 24	2
25 - 34	3
35 - 44	4
45 - 54	5
55 - 64	6
65 and over	7
Refused	8

13. Sex

18-

Male	1
Female	2

FOR OFFICE USE ONLY:

GENERAL POPULATION 19 - 1

STRATUM:

20-

Philadelphia SMSA	1
Pittsburgh SMSA	2
Other SMSA	3
Non-SMSA	4

Chilton Research Services
Radnor, Pennsylvania

Study #9461
July, 1977

Interview # ___________
(1 - 4)

MOTORCYCLE HELMET STUDY

Time began_____AM_____PM

Time ended_____AM_____PM

Hello, may I speak to (NAMED RESPONDENT) please?

Good __________, I'm calling from Philadelphia for the Govenor's Traffic Safety Council. We are interested in the opinions of Pennsylvania residents regarding some vital highway safety issues.

(IF ASKED: WHERE DID YOU GET MY NAME AND PHONE NUMBER? - SAY: WE WERE GIVEN YOUR NAME BY THE GOVERNOR'S TRAFFIC SAFETY COUNCIL IN HARRISBURG, PA.)

(IF ASKED: WHO CAN I CALL IN HARRISBURG TO VERIFY THIS? - SAY: YOU MAY CALL MR. PHILIP DEEMER AT THE GOVERNOR'S TRAFFIC SAFETY COUNCIL - #717-787-6853.)

5 - sp

1. Do you think the 55 MPH speed limit is effective in reducing injuries?

6-

Yes	1
No	2
Don't Know	V

2. Do you think seat belts are effective in reducing injuries?

7-

Yes	1
No	2
Don't Know	V

3. Do you think that operating motorcycles with lights on during the day helps avoid accidents?

8-

Yes	1
No	2
Don't Know	V

4. Do you think use of helmets by motorcyclists is effective in reducing injuries?

9-

Yes	1
No	2
Don't Know	V

5. In your opinion, should the government require a maximum 55 MPH speed limit?

10-

Yes	1
No	2
Don't Know	V

6. In your opinion, should the government require mandatory use of seat belts?

11-

Yes	1
No	2
Don't Know	V

7. In your opinion, should the government require mandatory operation of motorcycles with lights on?

12-

Yes	1
No	2
Don't Know	V

8. In your opinion, should the government require mandatory use of motorcycle helmets?

13-

Yes	1
No	2
Don't Know	V

9. Are you aware that there was a major change in Pennsylvania's traffic laws on July 1?

14-

Yes	1
No	2
Don't Know	V

15 - sp

10. Are you a registered voter?

16-

Yes	1
No	2
Don't Know	V

11. What is your age? (IF RESPONDENT HESITATES, ASK WHICH OF THE FOLLOWING AGE CATEGORIES HE/SHE FITS INTO)

17-

Under 18	1
18 - 24	2
25 - 34	3
35 - 44	4
45 - 54	5
55 - 64	6
65 and over	7
Refused	8

12. Sex

18-

Male	1
Female	2

FOR OFFICE USE ONLY:

MOTORCYCLISTS 19 - 2

STRATUM:

20-

Philadelphia SMSA	1
Pittsburgh SMSA	2
Other SMSA	3
Non-SMSA	4

MOTORCYCLE HELMET STUDY

QUESTION 4 DO YOU THINK USE OF HELMETS BY MOTORCYCLISTS IS EFFECTIVE IN REDUCING INJURIES?

GENERAL POPULATION

		GEOGRAPHIC AREA				VOTING STATUS		SEX		OPERATOR STATUS	
										MOTORCYCLISTS	
	TOTAL	PHILA. SMSA	PITTS-BURGH SMSA	OTHER SMSA	NON-SMSA	VOTERS	NON-VOTERS	MALE	FEMALE	IN HOME	NOT IN HOME
UNWEIGHTED BASE	500 100.0	140 100.0	83 100.0	195 100.0	82 100.0	389 100.0	109 100.0	202 100.0	298 100.0	67 100.0	433 100.0
TOTAL RESPONDENTS	1169 100.0	348 100.0	182 100.0	448 100.0	190 100.0	906 100.0	258 100.0	561 100.0	608 100.0	176 100.0	989 100.0
YES	1073 91.8	328 94.3	165 90.7	410 91.5	171 90.0	837 92.4	232 89.9	495 88.2	578 95.1	157 89.2	913 92.3
NO	43 3.7	15 4.3	3 1.6	16 3.6	9 4.7	28 3.1	15 5.8	28 5.0	15 2.5	10 5.7	33 3.3
DON'T KNOW	52 4.4	6 1.7	14 7.7	22 4.9	10 5.3	41 4.5	11 4.3	37 6.6	15 2.5	9 5.1	44 4.4
NO ANSWER/REFUSED											

MOTORCYCLE HELMET STUDY

QUESTION 4 DO YOU THINK USE OF HELMETS BY MOTORCYCLISTS IS EFFECTIVE IN REDUCING INJURIES?

		MOTORCYCLISTS							
		GEOGRAPHIC AREA				VOTING STATUS		SEX	
	TOTAL	PHILA. SMSA	PITTS-BURGH SMSA	OTHER SMSA	NON-SMSA	VOTERS	NON-VOTERS	MALE	FEMALE
TOTAL RESPONDENTS	500 100.0	84 100.0	81 100.0	175 100.0	160 100.0	337 100.0	161 100.0	483 100.0	17 100.0
YES	394 78.8	60 71.4	66 81.5	140 80.0	128 80.0	273 81.0	119 73.9	377 78.1	17 100.0
NO	92 18.4	19 22.6	14 17.3	30 17.1	29 18.1	55 16.3	37 23.0	92 19.0	
DON'T KNOW	14 2.8	5 6.0	1 1.2	5 2.9	3 1.9	9 2.7	5 3.1	14 2.9	
NO ANSWER/REFUSED									

MOTORCYCLE HELMET STUDY

QUESTION 8 IN YOUR OPINION, SHOULD THE GOVERNMENT REQUIRE MANDATORY USE OF MOTORCYCLE HELMETS?

		GENERAL POPULATION								OPERATOR STATUS	
		GEOGRAPHIC AREA				VOTING STATUS		SEX		MOTORCYCLISTS	
	TOTAL	PHILA. SMSA	PITTS-BURGH SMSA	OTHER SMSA	NON-SMSA	VOTERS	NON-VOTERS	MALE	FEMALE	IN HOME	NOT IN HOME
UNWEIGHTED BASE	500 100.0	140 100.0	83 100.0	195 100.0	82 100.0	389 100.0	109 100.0	202 100.0	298 100.0	67 100.0	432 100.0
TOTAL RESPONDENTS	1169 100.0	348 100.0	182 100.0	448 100.0	190 100.0	906 100.0	258 100.0	561 100.0	608 100.0	176 100.0	993 100.0
YES	1018 87.1	317 91.1	170 93.4	370 82.6	161 84.7	788 87.0	226 87.6	457 81.5	561 92.3	147 83.5	868 87.[illegible]
NO	116 9.9	27 7.8	12 6.6	58 12.9	20 10.5	97 10.7	19 7.4	84 15.0	32 5.3	29 16.5	87 8.[illegible]
DON'T KNOW	34 2.9	5 1.4		21 4.7	8 4.2	21 2.3	13 5.0	19 3.4	15 2.5		34 3.[illegible]
NO ANSWER/REFUSED											

MOTORCYCLE HELMET STUDY

QUESTION 8 IN YOUR OPINION, SHOULD THE GOVERNMENT REQUIRE MANDATORY USE OF MOTORCYCLE HELMETS?

		MOTORCYCLISTS							
		GEOGRAPHIC AREA				VOTING STATUS		SEX	
	TOTAL	PHILA. SMSA	PITTS-BURGH SMSA	OTHER SMSA	NON-SMSA	VOTERS	NON-VOTERS	MALE	FEMALE
TOTAL RESPONDENTS	500	84	81	175	160	337	161	483	17
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
YES	275	39	38	97	101	189	84	262	13
	55.0	46.4	46.9	55.4	63.1	56.1	52.2	54.2	76.5
NO	219	44	41	76	58	144	75	215	4
	43.8	52.4	50.6	43.4	36.3	42.7	46.6	44.5	23.5
DON'T KNOW	5	1	2	2		3	2	5	
	1.0	1.2	2.5	1.1		.9	1.2	1.0	
NO ANSWER/REFUSED	1				1	1		1	
	.2				.6	.3		.2	

MOTORCYCLE HELMET STUDY

QUESTION 3 DO YOU THINK THAT OPERATING MOTORCYCLES WITH LIGHTS ON DURING THE DAY HELPS AVOID ACCIDENTS?

		GENERAL POPULATION									
		GEOGRAPHIC AREA				VOTING STATUS		SEX		OPERATOR STATUS	
										MOTORCYCLISTS	
	TOTAL	PHILA. SMSA	PITTS-BURGH SMSA	OTHER SMSA	NON-SMSA	VOTERS	NON-VOTERS	MALE	FEMALE	IN HOME	NOT IN HOME
UNWEIGHTED BASE	500 100.0	140 100.0	83 100.0	195 100.0	82 100.0	389 100.0	109 100.0	202 100.0	298 100.0	57 100.0	432 100.0
TOTAL RESPONDENTS	1169 100.0	348 100.0	182 100.0	448 100.0	190 100.0	906 100.0	258 100.0	561 100.0	608 100.0	176 100.0	[illegible] 100.0
YES	695 59.5	168 48.3	89 48.9	317 70.8	121 63.7	545 60.2	146 56.6	356 63.5	339 55.8	123 69.9	564 57.5
NO	306 26.2	127 36.5	55 30.2	82 18.3	42 22.1	228 25.2	78 30.2	148 26.4	158 26.0	44 25.0	[illegible] [illegible]
DON'T KNOW	167 14.3	53 15.2	39 21.4	49 10.9	27 14.2	133 14.7	34 13.2	56 10.0	111 18.3	10 5.7	157 [illegible]
NO ANSWER/REFUSED											

MOTORCYCLE HELMET STUDY

QUESTION 3 DO YOU THINK THAT OPERATING MOTORCYCLES WITH LIGHTS ON DURING THE DAY HELPS AVOID ACCIDENTS?

MOTORCYCLISTS

		GEOGRAPHIC AREA				VOTING STATUS		SEX	
	TOTAL	PHILA. SMSA	PITTS- BURGH SMSA	OTHER SMSA	NON- SMSA	VOTERS	NON- VOTERS	MALE	FEMALE
TOTAL RESPONDENTS	500 100.0	84 100.0	81 100.0	175 100.0	160 100.0	337 100.0	161 100.0	483 100.0	17 100.0
YES	387 77.4	59 70.2	52 64.2	142 81.1	134 83.8	265 78.6	121 75.2	372 77.0	15 88.2
NO	95 19.0	22 26.2	24 29.6	26 14.9	23 14.4	60 17.8	35 21.7	93 19.3	2 11.8
DON'T KNOW	17 3.4	3 3.6	5 6.2	7 4.0	2 1.3	11 3.3	5 3.1	17 3.5	
NO ANSWER/REFUSED	1 .2				1 .6	1 .3		1 .2	

MOTORCYCLE HELMET STUDY

BANNER [illegible] - TABLE 7

QUESTION 7 IN YOUR OPINION, SHOULD THE GOVERNMENT REQUIRE MANDATORY OPERATION OF MOTORCYCLES WITH LIGHTS ON?

GENERAL POPULATION

		GEOGRAPHIC AREA				VOTING STATUS		SEX		OPERATOR STATUS MOTORCYCLISTS	
	TOTAL	PHILA. SMSA	PITTS-BURGH SMSA	OTHER SMSA	NON-SMSA	VOTERS	NON-VOTERS	MALE	FEMALE	IN HOME	NOT IN HOME
UNWEIGHTED BASE	500 100.0	140 100.0	83 100.0	195 100.0	82 100.0	389 100.0	109 100.0	202 100.0	298 100.0	67 100.0	433 100.0
TOTAL RESPONDENTS	1169 100.0	348 100.0	182 100.0	448 100.0	190 100.0	906 100.0	258 100.0	561 100.0	608 100.0	176 100.0	993 100.0
YES	649 55.5	167 48.0	101 55.5	266 59.4	114 60.0	509 56.2	136 52.7	297 52.9	352 57.9	115 65.3	534 53.7
NO	390 33.4	155 44.5	63 34.6	114 25.4	57 30.0	295 32.6	94 36.4	200 35.7	190 31.3	50 28.4	340 34.4
DON'T KNOW	130 11.1	26 7.5	18 9.9	67 15.0	19 10.0	101 11.1	29 11.2	64 11.4	66 10.9	12 6.8	118 11.
NO ANSWER/REFUSED											

MOTORCYCLE HELMET STUDY

BANNER TWO - TABLE 7

QUESTION 7 IN YOUR OPINION, SHOULD THE GOVERNMENT REQUIRE MANDATORY OPERATION OF MOTORCYCLES WITH LIGHTS ON?

		MOTORCYCLISTS							
		GEOGRAPHIC AREA				VOTING STATUS		SEX	
	TOTAL	PHILA. SMSA	PITTS- BURGH SMSA	OTHER SMSA	NON- SMSA	VOTERS	NON- VOTERS	MALE	FEMALE
TOTAL RESPONDENTS	500	84	81	175	160	337	161	483	17
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
YES	289	38	34	113	104	197	92	280	9
	57.8	45.2	42.0	64.6	65.0	58.5	57.1	58.0	52.9
NO	200	42	44	60	54	130	68	192	8
	40.0	50.0	54.3	34.3	33.8	38.6	42.2	39.8	47.1
DON'T KNOW	11	4	3	2	2	10	1	11	
	2.2	4.8	3.7	1.1	1.3	3.0	.6	2.3	
NO ANSWER/REFUSED									